RM1x

SEQUENCE REMIXER

# SERVICE MANUAL

■ CONTENTS




SY 011446
19981201-99800

YAMAHA
HAMAMATSU,JAPAN
1.92K-*** Ⓘ Printed in Japan'98.12

# IMPORTANT NOTICE

This manual has been provided for the use of authorized Yamaha Retailers and their service personnel. It has been assumed that basic service procedures inherent to the industry, and more specifically Yamaha Products, are already known and understood by the users, and have therefore not been restated.

**WARNING:** Failure to follow appropriate service and safety procedures when servicing this product may result in personal injury, destruction of expensive components and failure of the product to per form as specified. For these reasons, we advise all Yamaha product owners that all service required should be performed by an authorized Yamaha Retailer or the appointed service representative.

**IMPORTANT:** This presentation or sale of this manual to any individual or firm does not constitute authorization, certification, recognition of any applicable technical capabilities, or establish a principal-agent relationship of any form.

The data provided is believed to be accurate and applicable to the unit(s) indicated on the cover. The research engineering, and service departments of Yamaha are continually striving to improve Yamaha products. Modifications are, therefor, inevitable and changes in specification are subject to change without notice or obligation to retrofit. Should any discrepancy appear to exist, please contact the distributor's Service Division.

**WARNING:** Static discharges can destroy expensive components. Discharge any static electricity you body may have accumulated by grounding yourself to the ground buss in the unit (heavy gauge black wires connect to this buss).

**IMPORTANT:** Turn the unit OFF during disassembly and parts replacement. Recheck all work before you apply power to the unit.

# WARNING: CHEMICAL CONTENT NOTICE!

The solder used in the production of this product contains LEAD. In addition, other electrical / electronic and / or plastic (where applicable) components may also contain traces of chemicals found by the California Health and Welfare Agency (and possibly other entities) to cause cancer and / or birth defects or other reproductive harm.

DO NOT PLACE SOLDER, ELECTRICAL / ELECTRONIC OR PLASTIC COMPONENTS IN YOUR MOUTH FOR ANY REASON WHAT SO EVER!

Avoid prolonged, unprotected contact between solder and your skin! When soldering, do not inhale solder fumes or expose eyes to solder / flux vapor!

If you come in contact with solder or components located inside the enclosure of this product, wash your hands before handling food.

# LUTHIUM BATTERY HANDLING

This product uses a lithium battery for memory back-up.

**WARNING:** Lithium batteries are dangerous because they can be exploded by improper handling. Observe the following precautions when handling or replacing lithium batteries.

- Leave lithium battery replacement to qualified service personnel.
- Always replace with batteries of the same type.
- When installing on the PC board by soldering, solder using the connection terminals provided on the battery cells. Never solder directly to the cells. perform the soldering as quickly as possible.
- Never reverse the battery polarities when installing.
- Do not short the batteries.
- Do not attempt to recharge these batteries.
- Do not disassemble the batteries.
- Never heat batteries or throw them into fire.

**ADVARSEL!**
Lithiumbatteri—Eksplosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Levér det brugte batteri tilbage til leverandoren.

**VARNING**
Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enlight fabrikantens instruktion.

**VAROITUS**
Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

The following information complies with Dutch Official Gazette 1995. 45; ESSENTIALS OF ORDER ON THE COLLECTION OF BATTERIES.

- Please refer to the diassembly procedure for the removal of Back-up Battery.
- Leest u voor het verwijderen van de backup batterij deze beschrijving.

## ■ WARNING

Components having special characteristics are marked and must be replaced with parts having specification equal to those originally installed.

## ■ SPECIFICATIONS

### Sequencer block

| | |
|---|---|
| Data capacity | approximately 110,000 notes |
| Note resolution | 480 clocks per quarter note |
| Polyphony | 64 notes |
| BPM (Tempo) | 25.0 - 300.0 |
| Recording method | Realtime Recording (Replace)<br>Realtime Recording (Overdub)<br>Realtime Recording (Punch In) - only the Song mode<br>Step Recording<br>Grid Step Recording |
| Tracks | Pattern : 16 tracks<br>Song : 16 tracks, BPM track |
| Patterns | 960 preset patterns (60 styles x 16 sections)<br>800 user patterns (50 styles x 16 sections)<br>Measures : Up to 256 |
| Phrases | Over 7,000 preset phrases<br>256 user phrases/1 user style |
| Pattern Chain | 20 chains |
| Songs | 20 user songs |
| Edit | Phrase edit<br>Song edit |
| Jobs | Pattern jobs : 36<br>Pattern chain jobs : 8<br>Song jobs : 28 |
| Split | Split song, Split pattern |
| Groove | Grid Groove (Note offset, Clock shift, Gate time offset, Velocity offset) |
| Play Fx | Harmonize (Unison, Octaver, Harmonize1, 2)<br>Play Fx (Beat stretch, Clock shift, Gate time, Velocity offset) |
| MIDI delay | MIDI delay edit, Feedback edit |
| Arpeggio | Type (Up, Down, Alternate1, 2, Random) , Sort, Hold, Octave range |
| Sequence file formats | RM1x native sequence format, SMF format 0 |
| Demo song | 4 (Included disk) |

### Tone generator block

| | |
|---|---|
| Type | AWM2 tone generator |
| Maximum polyphony | 32 notes |
| Multi-timbral capability | 16 timbres (with DVA) |
| Preset voices | Normal voices 654 (except GM voices)<br>Drum voices 46 kits (except GM kits) |
| Effects | 3 systems (Reverb effect, Chorus effect, Variation effect) |
| Reverb | 11 types |
| Chorus | 11 types |
| Variation | 43 types |
| Digital low boost | Frequency (50Hz - 2.0kHz), Gain (+/-24dB) |

### Controls

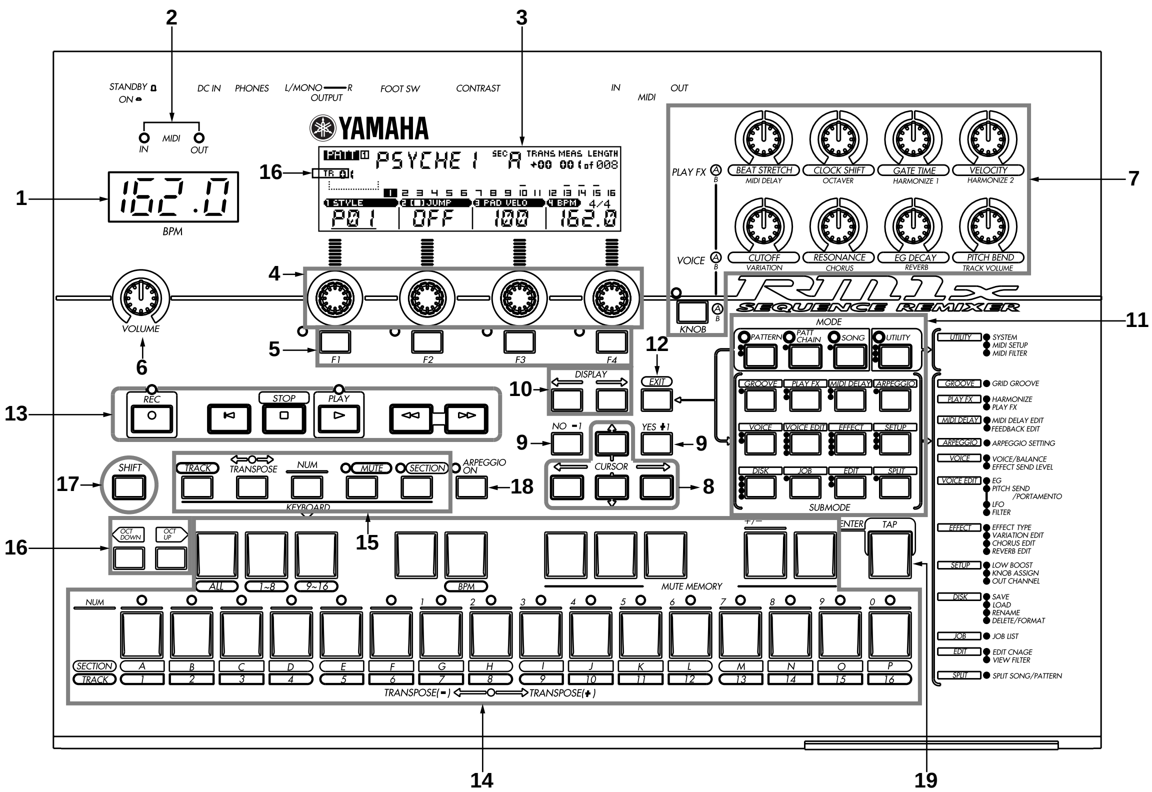
| | |
|---|---|
| Standby / On switch (STANDBY / ON) | |
| Volume control (VOLUME) | |
| Assignable knobs (x 8) | |
| Display knobs (x 4) | |
| CONTRAST control | |
| Mode buttons | [PATTERN], [PATT CHAIN], [SONG], [UTILITY] |
| Submode buttons | [GROOVE], [PLAY FX], [MIDI DELAY], [ARPEGGIO],[VOICE], [VOICE EDIT], [EFFECT], [SETUP], [DISK], [JOB], [EDIT], [SPLIT] |
| Function buttons | [F1] - [F4] |
| Knob A/B button | [KNOB] |

| | |
|---|---|
| Eject button | [EXIT] |
| Display button | [DISPLAY←], [DISPLAY→] |
| Sequencer buttons | [▶], [■], [●], [◀◀], [▶▶], [\|◀] |
| Data entry buttons | [NO -1], [YES+1] |
| Cursor buttons | [CURSOR↑], [CURSOR↓], [CURSOR←], [CURSOR→] |
| Shift button | [SHIFT] |
| Keyboard mode buttons | [TRACK], [TRANSPOSE], [NUM], [MUTE], [SECTION] |
| Arpeggio on button | [ARPEGGIO ON] |
| Octave button | [OCT DOWN] , [OCT UP] |
| Keyboard pad | E2 - F4, Tap tempo button [TAP] |
| **Display (LCD)** | 64 x 240 dot graphic LCD<br>(with CFL backlight, adjustable contrast) |
| **LED indicators** | MODE ( x 4) (green)<br>REC (red)<br>PLAY (green)<br>TRACK (x 16) (red)<br>KEYBOARD MODE - MUTE (red), SECTION (red),<br>ARPEGGIO ON (red)<br>FUNCTION BUTTON (red x 4)<br>KNOB A/B (red)<br>MIDI IN (red), MIDI OUT (green)<br>7 segments LED (x 4) |
| **Connectors** | PHONES (stereo phone jack)<br>OUTPUT (phone jack x 2) (L/MONO, R)<br>FOOT SW<br>DC IN<br>MIDI IN, MIDI OUT |
| **Floppy disk drive** | 3.5 inch 2HD (MF2HD) and 2DD (MF2DD) types |
| **Power supply** | AC adaptor (PA-5C) |
| **Dimensions** | 420 mm (W) x 282 mm (D) x 98 mm (H) |
| **Weight** | 4.4kg |
| **Included items** | Power adaptor (PA-5C)<br>Floppy disk (Demo song)<br>Owner's manual |

* Specifications and appearance are subject to change without notice for improvement of the product.

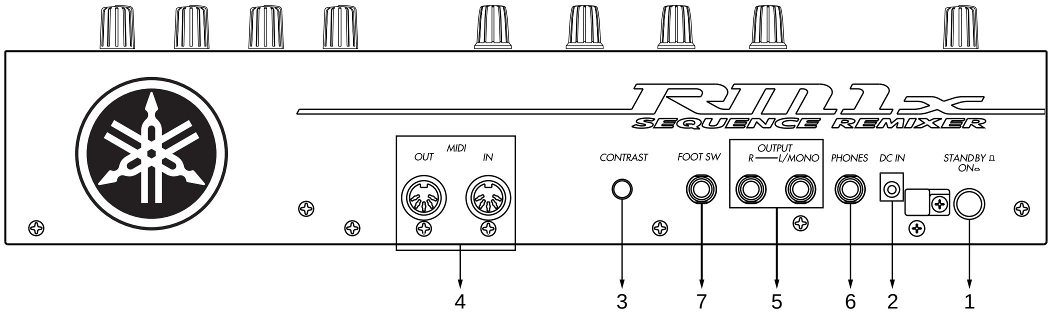
# ■ PANEL LAYOUT

## ● Front Panel



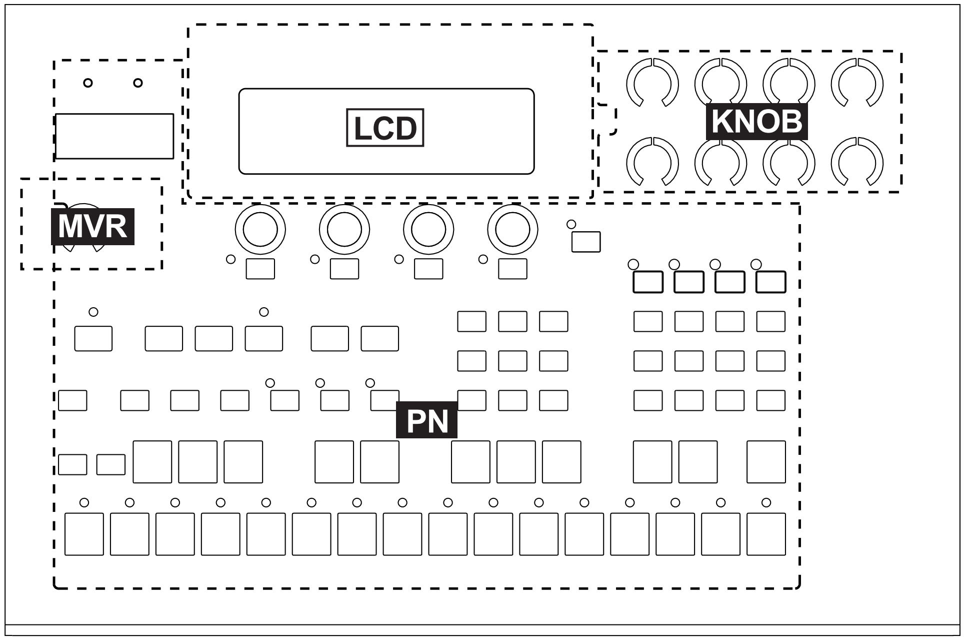

1. BPM Display
2. MIDI Data Monitors
3. LCD Display
4. Display Knobs
5. Function Buttons and Indicators
6. VOLUME Control
7. Real Time Controller Knobs & [KNOB] Button
8. Cursor Buttons
9. [NO -1] and [YES +1] Buttons
10. DISPLAY [<-] and [->] Buttons
11. MODE and SUBMODE Buttons
12. [EXIT] Button
13. Sequencer Buttons and Indicators
14. Keyboard
15. Keyboard Mode Buttons
16. [OCT DOWN] and [OCT UP] Buttons
17. [SHIFT] Button
18. [ARPEGGIO ON] Button
19. [TAP/ENTER] Button

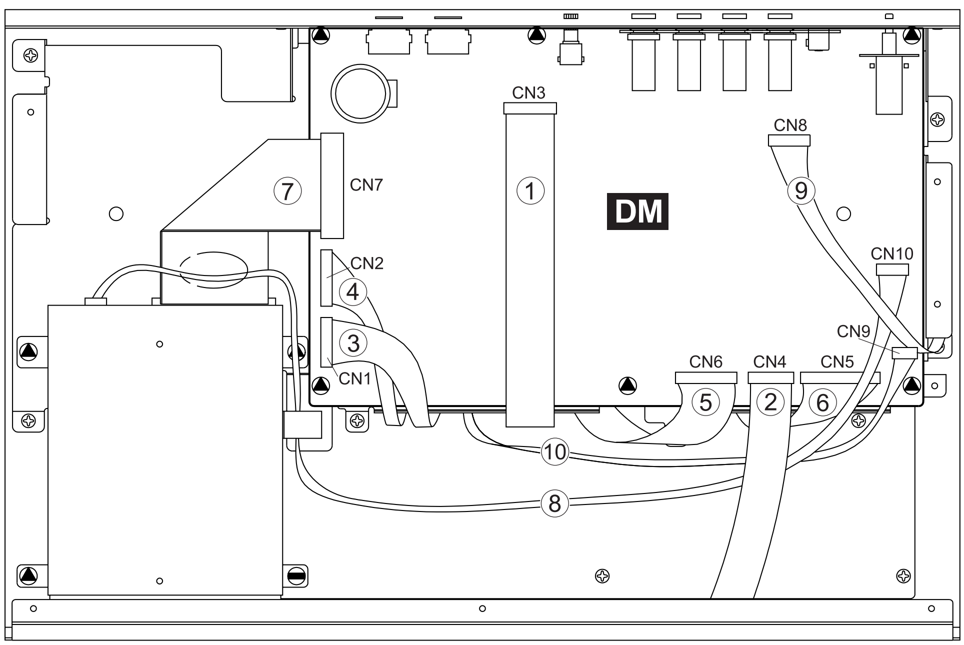
## ● Rear Panel




1. STANDBY/ON Switch
2. DC IN Jack
3. CONTRAST Control
4. MIDI IN & OUT Connectors
5. L/MONO & R OUTPUT Jacks
6. PHONES Jack
7. FOOT SW Jack

## CIRCUIT BOARD LAYOUT



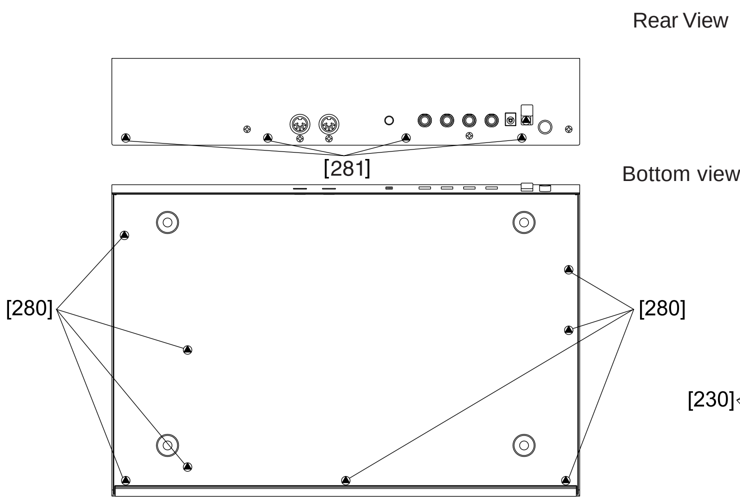




| REF. NO. | DESTINATION | | CONNECTOR ASSEMBLY | REMARKS | PART LIST REF. NO. |
|---|---|---|---|---|---|
| 1 | DM-NC3 | PN-CN3 | – | 8P/L300 | 110 |
| 2 | DM-CN4 | PN-CN4 | – | 9P/L150 | 120 |
| 3 | DM-CN1 | PN-CN1 | – | 10P/L250 | 130 |
| 4 | DM-CN2 | KNOB-CN2 | – | 11P/L350 | 140 |
| 5 | DM-CN6 | LCD | – | 12P/L300 | 150 |
| 6 | DM-CN5 | PN-CN5 | – | 16P/L200 | 160 |
| 7 | DM-CN7 | FDD Ass'y | FLAT | 34P/L120 | 170 |
| 8 | DM-CN10 | FDD | FDD | 3P/L500 | 180 |
| 9 | DM-CN8 | MVR | MVR | 6P/L200 | 190 |
| 10 | DM-CN9 | LCD Back Light | B-LIGHT | 2P/L | 60b |

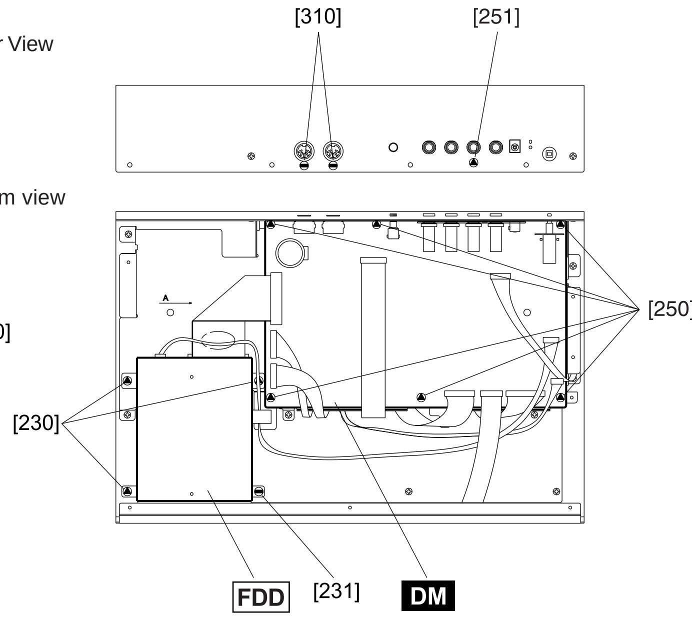
# DISASSEMBLY PROCEDURE

## 1. Bottom Case Assembly

1-1 Remove the eight (8) screws marked [280] and the four (4) screws marked [281]. The bottom case assembly can then be removed. (Fig. 1)




(Fig.1)




(Fig.2)

[280]: Bind Head Tapping Screw-B 3.0X6 MFZN2BL (EP600230)
[281]: Bonding Head Screw-B 3.0X10 MFZN2BL (VQ498000)

[230]: Bind Head Tapping Screw-B 3.0X6 MFZN2BL (EP600230)
[231]: Bind Head Tapping Screw-B 3.0X8 MFZN2BL (EP600190)
[250]: Bind Head Tapping Screw-B 3.0X6 MFZN2BL (EP600230)
[251]: Bonding Head Screw-B 3.0X10 MFZN2BL (VQ498000)
[310]: Bind Head Tapping Screw-B 3.0X8 MFZN2BL (EP600190)

## 2. DM Circuit Board

2-1 Remove the bottom case assembly. (See Procedure 1.)

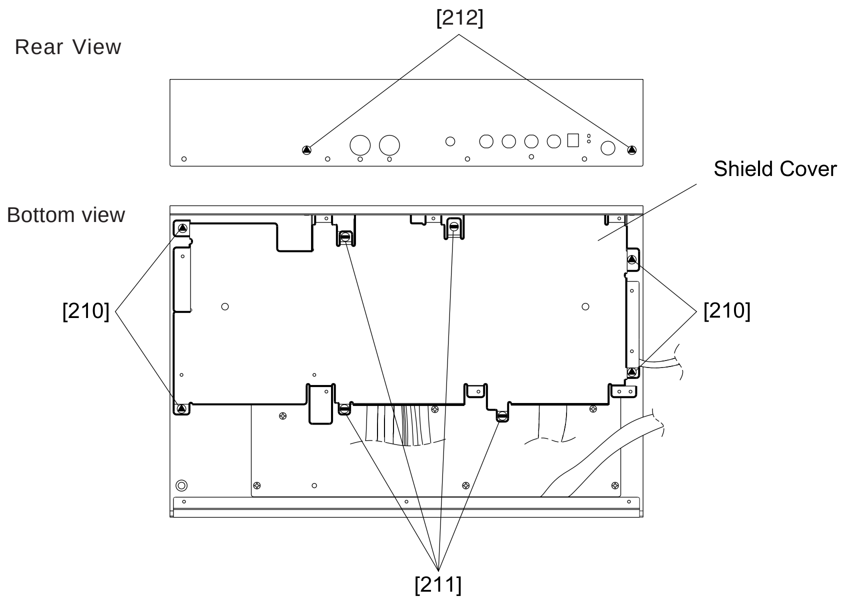
2-2 Remove the two (2) screws marked [310] and the screw marked [251] on the back of the upper case. (Fig. 2)

2-3 Remove the six (6) screws marked [250]. The DM circuit board can then be removed. (Fig. 2)

## 3. FDD Assembly

3-1 Remove the bottom case assembly. (See Procedure 1.)

3-2 Remove the three (3) screws marked [230] and the screw marked [231]. The FDD assembly can then be removed. (Fig. 2)

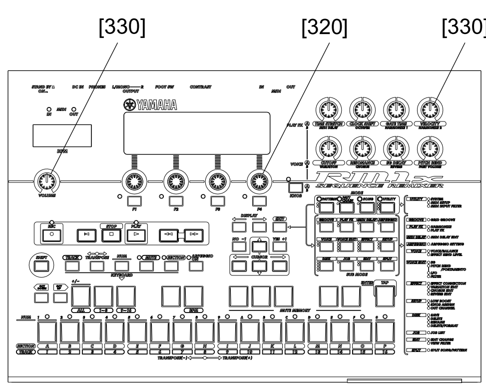



(Fig.3)

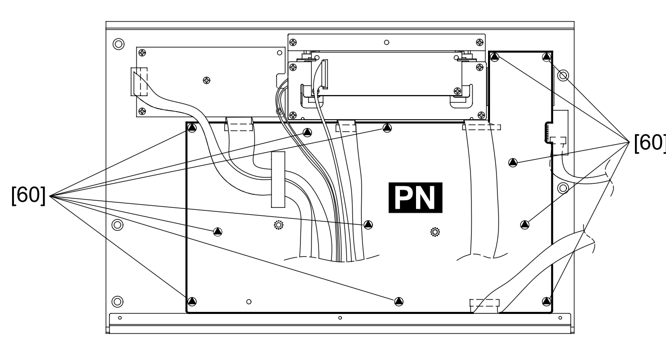
[210]: Bind Head Tapping Screw-B 3.0X6 MFZN2BL (EP600230)
[211]: Bind Head Tapping Screw-B 3.0X8 MFZN2BL (EP600190)
[212]: Bonding Head Screw-B 3.0X10 MFZN2BL (VQ498000)

## 4. PN Circuit Board

4-1 Remove the bottom case assembly. (See Procedure 1.)
4-2 Remove the DM circuit board. (See Procedure 2.)
4-3 Remove the FDD assembly. (See Procedure 3.)
4-4 Remove the four (4) screws marked [210], the two (2) screws marked [212] and the four (4) screws marked [211]. The shield cover can then be removed. (Fig. 3)
4-5 Remove the four (4) knobs marked [320]. (Fig. 4)
4-6 Remove the twelve (12) screws marked [60]. The PN circuit board can then be removed. (Fig. 5)



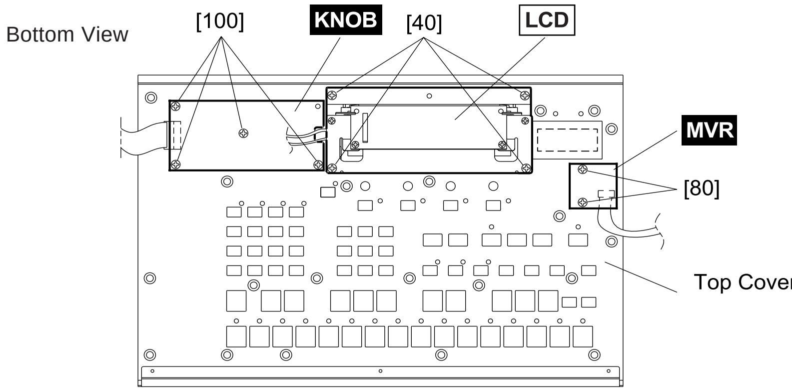

(Fig. 4)




(Fig.5)

[330]: Knob (V2887900)
[320]: Knob (V2647700)

[60]: Bind Head Tapping Screw-B 3.0X6 MFZN2BL (EP600230)




(Fig.6)

[40]: Bind Head Tapping Screw-B 3.0X8 MFZN2BL (EP600190)
[80]: Bind Head Tapping Screw-B 3.0X6 MFZN2BL (EP600230)
[100]: Bind Head Tapping Screw-B 3.0X6 MFZN2BL (EP600230)

## 5. Knob Circuit board

5-1 Remove the bottom case assembly. (See Procedure 1.)
5-2 Remove the DM circuit board. (See Procedure 2.)
5-3 Remove the FDD assembly. (See Procedure 3.)
5-4 Remove the shield cover. (See Procedure 4.)
5-5 Remove the nine (9) knobs marked [330]. (Fig. 4)
5-6 Remove the four (4) screws marked [100]. The KNOB circuit board can then be removed. (Fig. 6)

## 6. MVR Circuit Board

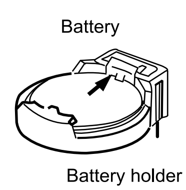
6-1 Remove the bottom case assembly. (See Procedure 1.)
6-2 Remove the DM circuit board. (See Procedure 2.)
6-3 Remove the FDD assembly. (See Procedure 3.)
6-4 Remove the shield cover. (See Procedure 4.)
6-5 Remove the PN circuit board. (See Procedure 4.)
6-6 Remove the volume knob marked [330]. (Fig.4)
6-7 Remove the two (2) screws marked [80]. The MVR circuit board can then be removed. (Fig.6)

## 7. LCD

7-1 Remove the bottom case assembly. (See Procedure 1.)
7-2 Remove the DM circuit board. (See Procedure 2.)
7-3 Remove the FDD assembly. (See Procedure 3.)
7-4 Remove the shield cover. (See Procedure 4.)
7-5 Remove the four (4) screws marked [40]. The LCD can then be removed. (Fig. 6)

**Battery VS246400**
VS246300 (Battery holder for VS246400)

- Notice for back-up battery removal push the battery as shown in figure, then the battery will pop up.
- Druk de batterij naar beneden zoals aangeven in de tekening, de batterij springt dan naar voren.



# ■ LSI PIN DESCRIPTION

## ● HG73C205FD (XU947A00) SWX000 TONE GENERATOR

| PIN NO. | NAME | I/O | FUNCTION | PIN NO. | NAME | I/O | FUNCTION |
|---|---|---|---|---|---|---|---|
| 1 | ICN | I | Initial clear | 85 | CMA3 | O | Program address bus |
| 2 | RFCLKI | I | PLL Clock | 86 | CMA8 | O | Program address bus |
| 3 | TM2 | I | PLL Control | 87 | CMA2 | O | Program address bus |
| 4 | AVDD_PLL | | Power supply | 88 | CRD | O | read signal |
| 5 | AVSS_PLL | | Ground | 89 | CMA1 | O | Program address bus |
| 6 | MODE0 | I | SWX dual mode | 90 | CUB | O | high byte effective signal |
| 7 | VCC7 | | Power supply | 91 | VCC91 | | Power supply |
| 8 | GND8 | | Ground | 92 | GHND92 | | Ground |
| 9 | XIN | I | crystal oscillator | 93 | CS1 | O | CS signal |
| 10 | XOUT | O | crystal oscillator | 94 | CMA0 | O | Program address bus |
| 11 | MODE1 | I | SWX separate mode | 95 | CLB | O | low byte effective signal |
| 12 | TEST0 | I | TEST pin | 96 | CMA12 | O | Program address bus |
| 13 | TESTON | I | TEST pin | 97 | CMA11 | O | Program address bus |
| 14 | AN0-P40 | I | A/D converter | 98 | CMA10 | O | Program address bus |
| 15 | AN1-P41 | I | A/D converter | 99 | CMA9 | O | Program address bus |
| 16 | AN2-P42 | I | A/D converter | 100 | GND100 | | Ground |
| 17 | AN3-P43 | I | A/D converter | 101 | CWE | O | write signal |
| 18 | AVDD_AN | | Power supply | 102 | CMA16 | O | Program address bus |
| 19 | AVSS_AN | | Ground | 103 | CMA15 | O | Program address bus |
| 20 | TXD0 | O | for MIDI or TO-HOST | 104 | CMA14 | O | Program address bus |
| 21 | TXD1 | O | for MIDI | 105 | CMA13 | O | Program address bus |
| 22 | EXCLK | I | Crystal oscillator | 106 | CMD8 | I/O | Program memory Data bus |
| 23 | SMD11 | I/O | Wave memory data bus | 107 | CMD7 | I/O | Program memory Data bus |
| 24 | SMD4 | I/O | Wave memory data bus | 108 | CMD9 | I/O | Program memory Data bus |
| 25 | SMD3 | I/O | Wave memory data bus | 109 | CMD6 | I/O | Program memory Data bus |
| 26 | SMD12 | I/O | Wave memory data bus | 110 | CMD10 | I/O | Program memory Data bus |
| 27 | SMD10 | I/O | Wave memory data bus | 111 | CMD5 | I/O | Program memory Data bus |
| 28 | SMD5 | I/O | Wave memory data bus | 112 | CMD11 | I/O | Program memory Data bus |
| 29 | SMD2 | I/O | Wave memory data bus | 113 | CMD4 | I/O | Program memory Data bus |
| 30 | SMD13 | I/O | Wave memory data bus | 114 | CMD12 | I/O | Program memory Data bus |
| 31 | SMD9 | I/O | Wave memory data bus | 115 | CMD3 | I/O | Program memory Data bus |
| 32 | SMD6 | I/O | Wave memory data bus | 116 | CMD13 | I/O | Program memory Data bus |
| 33 | SMD1 | I/O | Wave memory data bus | 117 | CMD2 | I/O | Program memory Data bus |
| 34 | SMD14 | I/O | Wave memory data bus | 118 | CMD14 | I/O | Program memory Data bus |
| 35 | VCC35 | | Power supply | 119 | VCC119 | | Power supply |
| 36 | GND36 | | Ground | 120 | GND115 | | Ground |
| 37 | SMD8 | I/O | Wave memory data bus | 121 | CMD1 | I/O | Program memory Data bus |
| 38 | SMD7 | I/O | Wave memory data bus | 122 | CMD15 | I/O | Program memory Data bus |
| 39 | SMD0 | I/O | Wave memory data bus | 123 | CMD0 | I/O | Program memory Data bus |
| 40 | SMD15 | I/O | Wave memory data bus | 124 | CMA21 | O | Program address bus |
| 41 | SOE | O | read signal | 125 | PDT15 | I/O | SWX access data bus |
| 42 | SWE | O | write signal | 126 | PDT14 | I/O | SWX access data bus |
| 43 | SRAS | O | RAS signal | 127 | PDT13 | I/O | SWX access data bus |
| 44 | SCAS | O | CAS signal | 128 | PDT12 | I/O | SWX access data bus |
| 45 | REFRESH | O | REFRESH signal | 129 | PDT11 | I/O | SWX access data bus |
| 46 | CS0 | O | CS signal | 130 | PDT10 | I/O | SWX access data bus |
| 47 | SMA0 | O | Memory address bus | 131 | PDT9 | I/O | SWX access data bus |
| 48 | SMA16 | O | Memory address bus | 132 | PDT8 | I/O | SWX access data bus |
| 49 | VCC49 | | Power supply | 133 | VCC133 | | Power supply |
| 50 | GND50 | | Ground | 134 | GND134 | | Ground |
| 51 | SMA1 | O | Memory address bus | 135 | PDT7 | I/O | SWX access data bus |
| 52 | SMA15 | O | Memory address bus | 136 | PDT6 | I/O | SWX access data bus |
| 53 | SMA2 | O | Memory address bus | 137 | PDT5 | I/O | SWX access data bus |
| 54 | SMA14 | O | Memory address bus | 138 | PDT4 | I/O | SWX access data bus |
| 55 | SMA3 | O | Memory address bus | 139 | PDT3 | I/O | SWX access data bus |
| 56 | SMA13 | O | Memory address bus | 140 | PDT2 | I/O | SWX access data bus |
| 57 | SMA4 | O | Memory address bus | 141 | PDT1 | I/O | SWX access data bus |
| 58 | SMA12 | O | Memory address bus | 142 | PDT0 | I/O | SWX access data bus |
| 59 | SMA5 | O | Memory address bus | 143 | VCA143 | | Power supply |
| 60 | GND60 | | Ground | 144 | GND144 | | Ground |
| 61 | VCC61 | | Power supply | 145 | PAD2 | I | SWX access address bus |
| 62 | SMA11 | O | Memory address bus | 146 | PAD1 | I | SWX access address bus |
| 63 | SMA6 | O | Memory address bus | 147 | PAD0 | I | SWX access address bus |
| 64 | SMA10 | O | Memory address bus | 148 | VCC148 | | Power supply |
| 65 | SMA7 | O | Memory address bus | 149 | GND149 | | Ground |
| 66 | SMA9 | O | Memory address bus | 150 | PCS | I | Chip select |
| 67 | SMA17 | O | Memory address bus | 151 | PWR | I | write enable |
| 68 | SMA8 | O | Memory address bus | 152 | PRD | I | read enable |
| 69 | SMA18 | O | Memory address bus | 153 | RXD0 | I | for MIDI or TO-HOST |
| 70 | SMA19 | O | Memory address bus | 154 | RXD1 | I | for MIDI or Key scan |
| 71 | SMA20 | O | Memory address bus | 155 | SCLKI | I | EXT Clock |
| 72 | SMA21 | O | Memory address bus | 156 | ADIN | I | A/D converter |
| 73 | SMA22 | O | Memory address bus | 157 | ADLR | O | A/D converter LR clock |
| 74 | SMA23 | O | Memory address bus | 158 | DO0 | O | DAC |
| 75 | CMA20 | O | Program address bus | 159 | DO1 | O | DAC |
| 76 | CMA19 | O | Program address bus | 160 | SYSCLK | O | 1/2 clock |
| 77 | VCC77 | | Power supply | 161 | VCC161 | | Power supply |
| 78 | GND78 | O | Ground | 162 | GND162 | | Ground |
| 79 | CMA18 | O | Program address bus | 163 | WCLK | O | for DAC LR clock |
| 80 | CMA17 | O | Program address bus | 164 | QCLK | O | 1/12 clock |
| 81 | CMA5 | O | Program address bus | 165 | BCLK | O | IIS-DAC clock |
| 82 | CMA6 | O | Program address bus | 166 | SYI | I | Synch signal |
| 83 | CMA4 | O | Program address bus | 167 | IRQ0 | I | Interrupt request |
| 84 | CMA7 | O | Program address bus | 168 | NMI | I | Interrupt request |

## ● HG73C201FD (XT890A00) SWX00 TONE GENERATOR

| PIN NO. | NAME | I/O | FUNCTION | PIN NO. | NAME | I/O | FUNCTION |
|---|---|---|---|---|---|---|---|
| 1 | ICN | I | Initial clear | 85 | CMA3 | O | |
| 2 | RFCLKI | I | PLL Clock | 86 | CMA8 | O | |
| 3 | TM2 | I | PLL Control | 87 | CMA2 | O | |
| 4 | AVDD_PLL | | Power supply | 88 | CRD | O | read signal |
| 5 | AVSS_PLL | | Ground | 89 | CMA1 | O | Program address bus |
| 6 | MODE0 | I | Mode set | 90 | CUB | O | high byte effective signal |
| 7 | VCC7 | | Power supply | 91 | VCC91 | | Power supply |
| 8 | GND8 | | Ground | 92 | GHND92 | | Ground |
| 9 | XIN | I | crystal oscillator | 93 | CS1 | O | CS signal |
| 10 | XOUT | O | crystal oscillator | 94 | CMA0 | O | Program address bus |
| 11 | MODE1 | I | Mode set | 95 | CLB | O | low byte effective signal |
| 12 | TEST0 | I | TEST pin | 96 | CMA12 | O | |
| 13 | TESTON | I | TEST pin | 97 | CMA11 | O | Program address bus |
| 14 | AN0-P40 | I | | 98 | CMA10 | O | |
| 15 | AN1-P41 | I | Analog Signal | 99 | CMA9 | O | |
| 16 | AN2-P42 | I | | 100 | GND100 | | Ground |
| 17 | AN3-P43 | I | | 101 | CWE | O | write signal |
| 18 | AVDD_AN | | Power supply | 102 | CMA16 | O | |
| 19 | AVSS_AN | | Ground | 103 | CMA15 | O | Program address bus |
| 20 | TXD0 | O | for MIDI or TO-HOST | 104 | CMA14 | O | |
| 21 | TXD1 | O | for MIDI | 105 | CMA13 | O | |
| 22 | EXCLK | I | 1M Clock for to Hast | 106 | CMD8 | I/O | |
| 23 | SMD11 | I/O | | 107 | CMD7 | I/O | |
| 24 | SMD4 | I/O | | 108 | CMD9 | I/O | |
| 25 | SMD3 | I/O | | 109 | CMD6 | I/O | |
| 26 | SMD12 | I/O | | 110 | CMD10 | I/O | |
| 27 | SMD10 | I/O | | 111 | CMD5 | I/O | |
| 28 | SMD5 | I/O | Wave memory data bus | 112 | CMD11 | I/O | Program memory Data bus |
| 29 | SMD2 | I/O | | 113 | CMD4 | I/O | |
| 30 | SMD13 | I/O | | 114 | CMD12 | I/O | |
| 31 | SMD9 | I/O | | 115 | CMD3 | I/O | |
| 32 | SMD6 | I/O | | 116 | CMD13 | I/O | |
| 33 | SMD1 | I/O | | 117 | CMD2 | I/O | |
| 34 | SMD14 | I/O | | 118 | CMD14 | I/O | |
| 35 | VCC35 | | Power supply | 119 | VCC119 | | Power supply |
| 36 | GND36 | | Ground | 120 | GND115 | | Ground |
| 37 | SMD8 | I/O | | 121 | CMD1 | I/O | |
| 38 | SMD7 | I/O | Wave memory data bus | 122 | CMD15 | I/O | Program memory Data bus |
| 39 | SMD0 | I/O | | 123 | CMD0 | I/O | |
| 40 | SMD15 | I/O | | 124 | CMA21 | O | Program address bus |
| 41 | SOE | O | read signal | 125 | PDT15 | I/O | |
| 42 | SWE | O | write signal | 126 | PDT14 | I/O | |
| 43 | SRAS | O | RAS signal | 127 | PDT13 | I/O | |
| 44 | SCAS | O | CAS signal | 128 | PDT12 | I/O | |
| 45 | REFRESH | O | REFRESH signal | 129 | PDT11 | I/O | SWX access data bus |
| 46 | CS0 | O | CS signal | 130 | PDT10 | I/O | |
| 47 | SMA0 | O | Memory address bus | 131 | PDT9 | I/O | |
| 48 | SMA16 | O | Memory address bus | 132 | PDT8 | I/O | |
| 49 | VCC49 | | Power supply | 133 | VCC133 | | Power supply |
| 50 | GND50 | | Ground | 134 | GND134 | | Ground |
| 51 | SMA1 | O | | 135 | PDT7 | I/O | |
| 52 | SMA15 | O | | 136 | PDT6 | I/O | |
| 53 | SMA2 | O | | 137 | PDT5 | I/O | |
| 54 | SMA14 | O | | 138 | PDT4 | I/O | |
| 55 | SMA3 | O | Wave Memory address bus | 139 | PDT3 | I/O | SWX access data bus |
| 56 | SMA13 | O | | 140 | PDT2 | I/O | |
| 57 | SMA4 | O | | 141 | PDT1 | I/O | |
| 58 | SMA12 | O | | 142 | PDT0 | I/O | |
| 59 | SMA5 | O | | 143 | VCC143 | | Power supply |
| 60 | GND60 | | Ground | 144 | GND144 | | Ground |
| 61 | VCC61 | | Power supply | 145 | PAD2 | I | SWX access address bus |
| 62 | SMA11 | O | | 146 | PAD1 | I | SWX access address bus |
| 63 | SMA6 | O | | 147 | PAD0 | I | SWX access address bus |
| 64 | SMA10 | O | | 148 | VCC148 | | Power supply |
| 65 | SMA7 | O | | 149 | GND149 | | Ground |
| 66 | SMA9 | O | | 150 | PCS | I | SWX access Chip select |
| 67 | SMA17 | O | | 151 | PWR | I | SWX access write enable |
| 68 | SMA8 | O | Wave Memory address bus | 152 | PRD | I | SWX access read enable |
| 69 | SMA18 | O | | 153 | RXD0 | I | for MIDI or TO-HOST |
| 70 | SMA19 | O | | 154 | RXD1 | I | for MIDI or Key scan |
| 71 | SMA20 | O | | 155 | SCLKI | I | EXT Sync Clock |
| 72 | SMA21 | O | | 156 | ADIN | I | For Ext A/D converter |
| 73 | SMA22 | O | | 157 | ADLR | O | A/D converter LR clock |
| 74 | SMA23 | O | | 158 | DO0 | O | DAC |
| 75 | CMA20 | O | Program address bus | 159 | DO1 | O | DAC |
| 76 | CMA19 | O | Program address bus | 160 | SYSCLK | O | 1/2 clock |
| 77 | VCC77 | | Power supply | 161 | VCC161 | | Power supply |
| 78 | GND78 | O | Ground | 162 | GND162 | | Ground |
| 79 | CMA18 | O | | 163 | WCLK | O | for DAC LR clock |
| 80 | CMA17 | O | | 164 | QCLK | O | 1/12 clock |
| 81 | CMA5 | O | | 165 | BCLK | O | IIS-DAC clock |
| 82 | CMA6 | O | | 166 | SYI | I | Synch signal |
| 83 | CMA4 | O | Program address bus | 167 | IRQ0 | I | Interrupt request |
| 84 | CMA7 | O | | 168 | NMI | I | Interrupt request |

## • **SH7014** (XT437A00) **CPU**

| PIN NO. | NAME | I/O | FUNCTION | PIN NO. | NAME | I/O | FUNCTION |
|---|---|---|---|---|---|---|---|
| 1 | PE14 | O | Port E | 57 | D11 | I/O | Data bus |
| 2 | PE15 | O | Port E | 58 | D10 | I/O | |
| 3 | VSS | I | Ground | 59 | D9 | I/O | |
| 4 | A0 | O | Address bus | 60 | D8 | I/O | |
| 5 | A1 | O | | 61 | VSS | I | Ground |
| 6 | A2 | O | | 62 | D7 | I/O | Data bus |
| 7 | A3 | O | | 63 | D6 | I/O | |
| 8 | A4 | O | | 64 | D5 | I/O | |
| 9 | A5 | O | | 65 | VCC | I | Power supply |
| 10 | A6 | O | | 66 | D4 | I/O | Data bus |
| 11 | A7 | O | | 67 | D3 | I/O | |
| 12 | A8 | O | | 68 | D2 | I/O | |
| 13 | A9 | O | | 69 | D1 | I/O | |
| 14 | A10 | O | | 70 | D0 | I/O | |
| 15 | A11 | O | | 71 | VSS | I | Ground |
| 16 | A12 | O | | 72 | XTAL | I | CLK |
| 17 | A13 | O | | 73 | MD3 | I | Mode control |
| 18 | A14 | O | | 74 | EXTAL | I | CLK |
| 19 | A15 | O | | 75 | MD2 | I | Mode control |
| 20 | A16 | O | | 76 | NMI | I | Non-maskable interrupt request |
| 21 | VCC | I | Power supply | 77 | VCC | I | Power supply |
| 22 | PB1/A17 | O | Address bus | 78 | MD1 | I | Mode control |
| 23 | VSS | I | Ground | 79 | MD0 | I | Mode control |
| 24 | /RAS | O | Bus control | 80 | PLLVCC | I | CLK |
| 25 | /CASL | O | | 81 | PLLCAP | I | |
| 26 | /CASH | O | | 82 | PLLVSS | I | |
| 27 | VSS | O | Ground | 83 | PA15/CK | O | Port A |
| 28 | RDWR | O | | 84 | /RES | I | Reset |
| 29 | A18 | O | Port A | 85 | PE0 | I | Port E |
| 30 | A19 | O | | 86 | PE1 | I | |
| 31 | A20 | O | | 87 | PE2 | I | |
| 32 | PB9 | O | Port B | 88 | PE3 | I | |
| 33 | VSS | I | Ground | 89 | PE4 | I | |
| 34 | /RD | O | Bus control | 90 | VSS | I | Ground |
| 35 | /WDTOVF | O | NC | 91 | AN0 | I | A/D |
| 36 | /WRH | O | NC | 92 | AN1 | I | |
| 37 | VCC | I | Power supply | 93 | AN2 | I | |
| 38 | /WRL | O | Bus control | 94 | AN3 | I | |
| 39 | VSS | I | Ground | 95 | AN4 | I | |
| 40 | /CS1 | O | Bus control | 96 | AN5 | I | |
| 41 | /CS0 | O | Bus control | 97 | AVSS | I | Analog ground |
| 42 | PA9 | O | Port A | 98 | AN6 | I | A/D |
| 43 | PA8 | I | Port A | 99 | AN7 | I | A/D |
| 44 | /CS3 | O | Bus control | 100 | AVCC | I | Power supply |
| 45 | /CS2 | O | Bus control | 101 | VSS | I | Ground |
| 46 | PA5 | O | Port A | 102 | PE5 | O | Port E |
| 47 | PA4 | O | | 103 | VCC | I | Power supply |
| 48 | PA3 | O | | 104 | PE6 | O | Port E |
| 49 | /IRQ0 | I | Interrupt | 105 | PE7 | O | |
| 50 | TXD0 | O | SCI | 106 | PE8 | O | |
| 51 | RXD0 | I | SCI | 107 | PE9 | O | |
| 52 | D15 | I/O | Data bus | 108 | PE10 | O | |
| 53 | D14 | I/O | | 109 | VSS | I | Ground |
| 54 | D13 | I/O | | 110 | PE11 | O | Port E |
| 55 | VSS | I | Ground | 111 | PE12 | O | |
| 56 | D12 | I/O | Data bus | 112 | PE13 | O | |

## ● **µPD63200GS-E1** (XP867A00) DAC (Digital to Analog Converter)

| PIN NO. | NAME | I/O | FUNCTION | PIN NO. | NAME | I/O | FUNCTION |
|---|---|---|---|---|---|---|---|
| 1 | 4/8FS | I | 4/8 Fs selection | 9 | R. REF | | Channel R voltage reference |
| 2 | D. GND | | Digital ground | 10 | L. REF | | Channel L voltage reference |
| 3 | 16/8 BIT | I | 16 bit/8 bit selection | 11 | L. OUT | O | Channel L output |
| 4 | D. VDD | | Digital power supply | 12 | A. GND | | Analog ground |
| 5 | A. GND | | Analog ground | 13 | LRCX/WD | I | Left/right check, Word clock |
| 6 | R. OUT | O | Channel R output | 14 | LR/RSI | I | Left/right selection, Channel R series input |
| 7 | A. VDD | | Analog power supply | 15 | SI/LSI | I | Series input/Channel L series input |
| 8 | A. VDD | | | 16 | CLK | I | Clock |

## ● **HD63266F** (XI939A00) **FDC** (Floppy Disk Controller)

| PIN NO. | NAME | I/O | FUNCTION | PIN NO. | NAME | I/O | FUNCTION |
|---|---|---|---|---|---|---|---|
| 1 | 8"/5" | I | Data transmission speed | 33 | /TRKO | I | Track 00 signal |
| 2 | XTALSET | I | Clock select | 34 | /INDEX | I | Index signal |
| 3 | /RESET | I | Rest | 35 | /RDATA | I | Read data input from FDD |
| 4 | E//RD | I | Enable/Read | 36 | XTAL2 | | |
| 5 | RW//WR | I | Read/write/Write | 37 | EXTAL2 | | Clock |
| 6 | /CS | I | Chip select | 38 | NC | | |
| 7 | /DACK | I | DMA acknowledge | 39 | XTAL1 | | |
| 8 | RS0 | I | Register select | 40 | EXTAL1 | | Clock |
| 9 | RS1 | I | | 41 | VSS4 | | |
| 10 | VSS1 | | | 42 | VSS5 | | Ground |
| 11 | VSS2 | | Ground | 43 | NC | | |
| 12 | D0 | I/O | | 44 | VCC2 | | |
| 13 | D1 | I/O | | 45 | VCC3 | | Power supply |
| 14 | D2 | I/O | | 46 | VCC4 | | |
| 15 | D3 | I/O | Data bus | 47 | /WGATE | O | Write control |
| 16 | D4 | I/O | | 48 | /WDATA | O | Write data to FDD |
| 17 | D5 | I/O | | 49 | VSS6 | | Ground |
| 18 | D6 | I/O | | 50 | /STEP | O | Step signal to control head of FDD |
| 19 | D7 | I/O | | 51 | /HDIR | O | Direction |
| 20 | /DREQ | O | DMA request | 52 | /HLOAD | O | Head load |
| 21 | /IRQ | O | Interrupt request | 53 | /HSEL | O | Head select |
| 22 | /DEND | I | Data end | 54 | VSS7 | | Ground |
| 23 | VSS3 | | Ground | 55 | /DS0 | O | |
| 24 | 1/2 EX1 | | | 56 | /DS1 | O | Drive select |
| 25 | VCC1 | | Power supply | 57 | /DS2 | O | |
| 26 | NUM1 | I | | 58 | /DS3 | O | |
| 27 | NUM3 | I | | 59 | VSS8 | | Ground |
| 28 | IFS | I | Host interface select | 60 | /MON0 | O | |
| 29 | SFORM | I | Format data | 61 | /MON1 | O | Motor on |
| 30 | /INP | I | Index pulse | 62 | /MON2 | O | |
| 31 | /READY | I | Ready from FDD | 63 | /MON3 | O | |
| 32 | /WPRT | I | Write control signal | 64 | VSS9 | | Ground |

## ● **SED1335F0B** (XQ595A00) **LCDC** (LCD Controller)

| PIN NO. | NAME | I/O | FUNCTION | PIN NO. | NAME | I/O | FUNCTION |
|---|---|---|---|---|---|---|---|
| 1 | VA5 | O | | 31 | XD2 | O | |
| 2 | VA4 | O | | 32 | XD1 | O | X driver data bus |
| 3 | VA3 | O | VRAM address bus | 33 | XD0 | O | |
| 4 | VA2 | O | | 34 | XECL | O | X driver enable chain clock |
| 5 | VA1 | O | | 35 | XSCL | O | X driver shift clock |
| 6 | VA0 | O | | 36 | VSS | | Ground |
| 7 | VR/W | O | VRAM write strobe | 37 | LP | O | Latch pulse |
| 8 | /VCE | O | VRAM chip enable | 38 | WF | O | Frame signal |
| 9 | NC | | | 39 | YDIS | O | LCD power down |
| 10 | /RES | I | Reset | 40 | YD | O | Scan start pulse |
| 11 | NC | | | 41 | YSCL | O | Scan shift clock |
| 12 | NC | | | 42 | VD7 | I/O | |
| 13 | /RD | I | 80: Read strobe, 68: E clock | 43 | VD6 | I/O | |
| 14 | /WR | I | 80: Write strobe, 68: Read/Write | 44 | VD5 | I/O | |
| 15 | SEL2 | I | CPU 80/68 bus select | 45 | VD4 | I/O | VRAM data bus |
| 16 | SEL1 | I | | 46 | VD3 | I/O | |
| 17 | OSC1 | I | Clock | 47 | VD2 | I/O | |
| 18 | OSC2 | O | | 48 | VD1 | I/O | |
| 19 | /CS | I | Chip select | 49 | VD0 | I/O | |
| 20 | A0 | I | Data bus signal discrimination | 50 | VA15 | O | |
| 21 | VDD | | Power supply | 51 | VA14 | O | |
| 22 | D0 | I/O | | 52 | VA13 | O | |
| 23 | D1 | I/O | | 53 | VA12 | O | |
| 24 | D2 | I/O | | 54 | VA11 | O | VRAM address bus |
| 25 | D3 | I/O | | 55 | VA10 | O | |
| 26 | D4 | I/O | Data bus | 56 | VA9 | O | |
| 27 | D5 | I/O | | 57 | VA8 | O | |
| 28 | D6 | I/O | | 58 | VA7 | O | |
| 29 | D7 | I/O | | 59 | VA6 | O | |
| 30 | XD3 | O | X driver data bus | 60 | NC | | |

## ● **SED1335F0B** (XQ595A00) LCDC (LCD Controller)

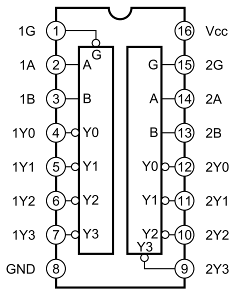
| PIN NO. | NAME | I/O | FUNCTION | PIN NO. | NAME | I/O | FUNCTION |
|---|---|---|---|---|---|---|---|
| 1 | VA5 | O | | 31 | XD2 | O | |
| 2 | VA4 | O | | 32 | XD1 | O | Data bus output for 4 bit dot |
| 3 | VA3 | O | VRAM address bus | 33 | XD0 | O | |
| 4 | VA2 | O | | 34 | XECL | O | S driver enable, chain clock |
| 5 | VA1 | O | | 35 | XSCL | O | Data bus shift clock |
| 6 | VA0 | O | | 36 | Vss | - | Ground |
| 7 | /VWR | O | VRAM read/write | 37 | LP | O | X driver latch pulse |
| 8 | /VCE | O | Memory control | 38 | WF | O | Frame signal for X/Y driver |
| 9 | /VRD | - | Not used | 39 | YDIS | O | Power down signal for displaying off mode |
| 10 | /RES | I | Initial clear | 40 | YD | O | Scan start signal |
| 11 | NC | - | Not used | 41 | YSCL | O | Scan shift clock |
| 12 | NC | - | Not used | 42 | VD7 | I/O | |
| 13 | /RD | I | Read strobe | 43 | VD6 | I/O | |
| 14 | /WR | I | Write strobe | 44 | VD5 | I/O | |
| 15 | SEL2 | I | Bus select | 45 | VD4 | I/O | VRAM data bus |
| 16 | SEL1 | I | Bus select | 46 | VD3 | I/O | |
| 17 | OSC1 | I | Clock | 47 | VD2 | I/O | |
| 18 | OSC2 | O | Clock | 48 | VD1 | I/O | |
| 19 | /CS | I | Chip select | 49 | VD0 | I/O | |
| 20 | A0 | I | Data mode select | 50 | VA15 | O | |
| 21 | Vdd | - | Power supply | 51 | VA14 | O | |
| 22 | D0 | I/O | | 52 | VA13 | O | |
| 23 | D1 | I/O | | 53 | VA12 | O | |
| 24 | D2 | I/O | | 54 | VA11 | O | VRAM address bus |
| 25 | D3 | I/O | Data bus | 55 | VA10 | O | |
| 26 | D4 | I/O | | 56 | VA9 | O | |
| 27 | D5 | I/O | | 57 | VA8 | O | |
| 28 | D6 | I/O | | 58 | VA7 | O | |
| 29 | D7 | I/O | | 59 | VA6 | O | |
| 30 | XD3 | O | Data bus output for 4 bit dot | 60 | NC | - | Not used |

## ● **SED1335FOB** (XQ595A00) LCDC

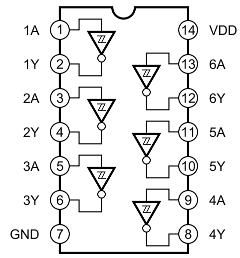
| PIN NO. | NAME | I/O | FUNCTION | PIN NO. | NAME | I/O | FUNCTION |
|---|---|---|---|---|---|---|---|
| 1 | VA5 | O | | 31 | XD2 | O | |
| 2 | VA4 | O | | 32 | XD1 | O | X Driver Data Bus |
| 3 | VA3 | O | VRAM Address Bus | 33 | XD0 | O | |
| 4 | VA2 | O | | 34 | XECL | O | Xdriver Enable Change Clock |
| 5 | VA1 | O | | 35 | XSCL | O | Xdriver Shift Clock |
| 6 | VA0 | O | | 36 | Vss | - | Groud |
| 7 | /VWR | O | VRAM Write Signal | 37 | LP | O | Latch Pulse |
| 8 | /VCE | O | VRAM Chip enable | 38 | WF | O | Frame Signal |
| 9 | NC | - | | 39 | YDIS | O | LCD Power Down Output |
| 10 | /RES | I | Reset Input Signal | 40 | YD | O | Scan Start Pulse |
| 11 | NC | - | | 41 | YSCL | O | Scan Sift Clock |
| 12 | NC | - | | 42 | VD7 | I/O | |
| 13 | /RD | I | Read Signal | 43 | VD6 | I/O | |
| 14 | /WR | I | Write Signal | 44 | VD5 | I/O | |
| 15 | SEL2 | I | Bus Select | 45 | VD4 | I/O | |
| 16 | SEL1 | I | Bus Select | 46 | VD3 | I/O | VRAM Data Bus |
| 17 | OSC1 | I | Oscillator1 | 47 | VD2 | I/O | |
| 18 | OSC2 | O | Oscillator2 | 48 | VD1 | I/O | |
| 19 | /CS | I | Chip Select Input Signal | 49 | VD0 | I/O | |
| 20 | A0 | I | Data Bus Signal Kind Judgement | 50 | VA15 | O | |
| 21 | Vdd | - | Power Supply | 51 | VA14 | O | |
| 22 | D0 | I/O | | 52 | VA13 | O | |
| 23 | D1 | I/O | | 53 | VA12 | O | |
| 24 | D2 | I/O | | 54 | VA11 | O | |
| 25 | D3 | I/O | | 55 | VA10 | O | VRAM Address Bus |
| 26 | D4 | I/O | Data Bus for System | 56 | VA9 | O | |
| 27 | D5 | I/O | | 57 | VA8 | O | |
| 28 | D6 | I/O | | 58 | VA7 | O | |
| 29 | D7 | I/O | | 59 | VA6 | O | |
| 30 | XD3 | O | X Driver Data Bus | 60 | NC | - | |

# ■ IC BLOCK DIAGRAM

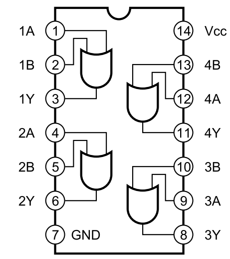
- **TC74AC139F**(XP231A00)
  Dual 2 to 4 Demultiplexer



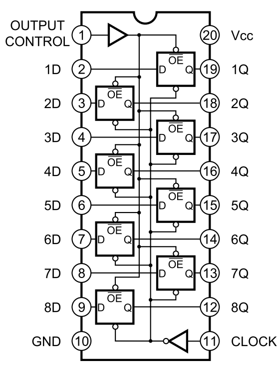

- **TC74HC14AF-TP1**(XD657A00)
  Hex Inverter



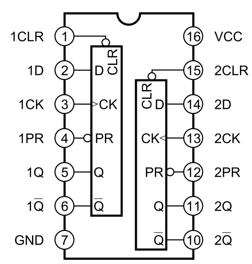

- **SN74HC32NSR**(XD833A00)
  Quad 2 Input OR




- **SN74HC574NSR**(XH225A00)
  Octal D-TYPE Flip-Flop

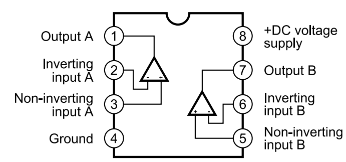



- **SN74HC74NSR**(XC726A00)
  Dual D-Type Flip-Flop

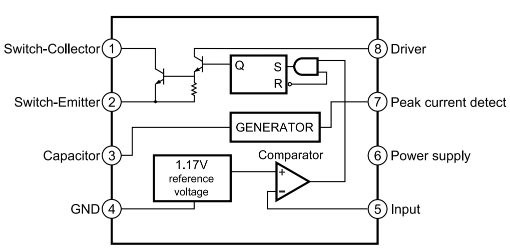



| INPUTS | | | | OUTPUTS | |
|---|---|---|---|---|---|
| PR | CLR | CLK | D | Q | Q̄ |
| L | H | X | X | H | L |
| H | L | X | X | L | H |
| L | L | X | X | H | H |
| H | H | ↑ | H | H | L |
| H | H | ↑ | L | L | H |
| H | H | L | X | $Q_0$ | $\bar{Q}_0$ |

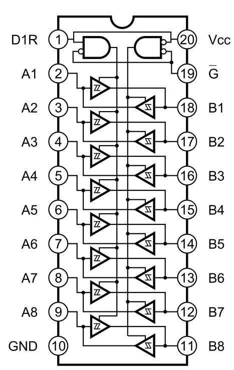
- μ **PC4570G2** (XF291A00)
- **NJM4566AMT1** (XQ138A00)
- **RC4558D-V**(IG001390)
  Dual Operational Amplifier



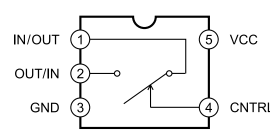

- **M5291FT-600C** (XR858A00)
  DC/DC Converter



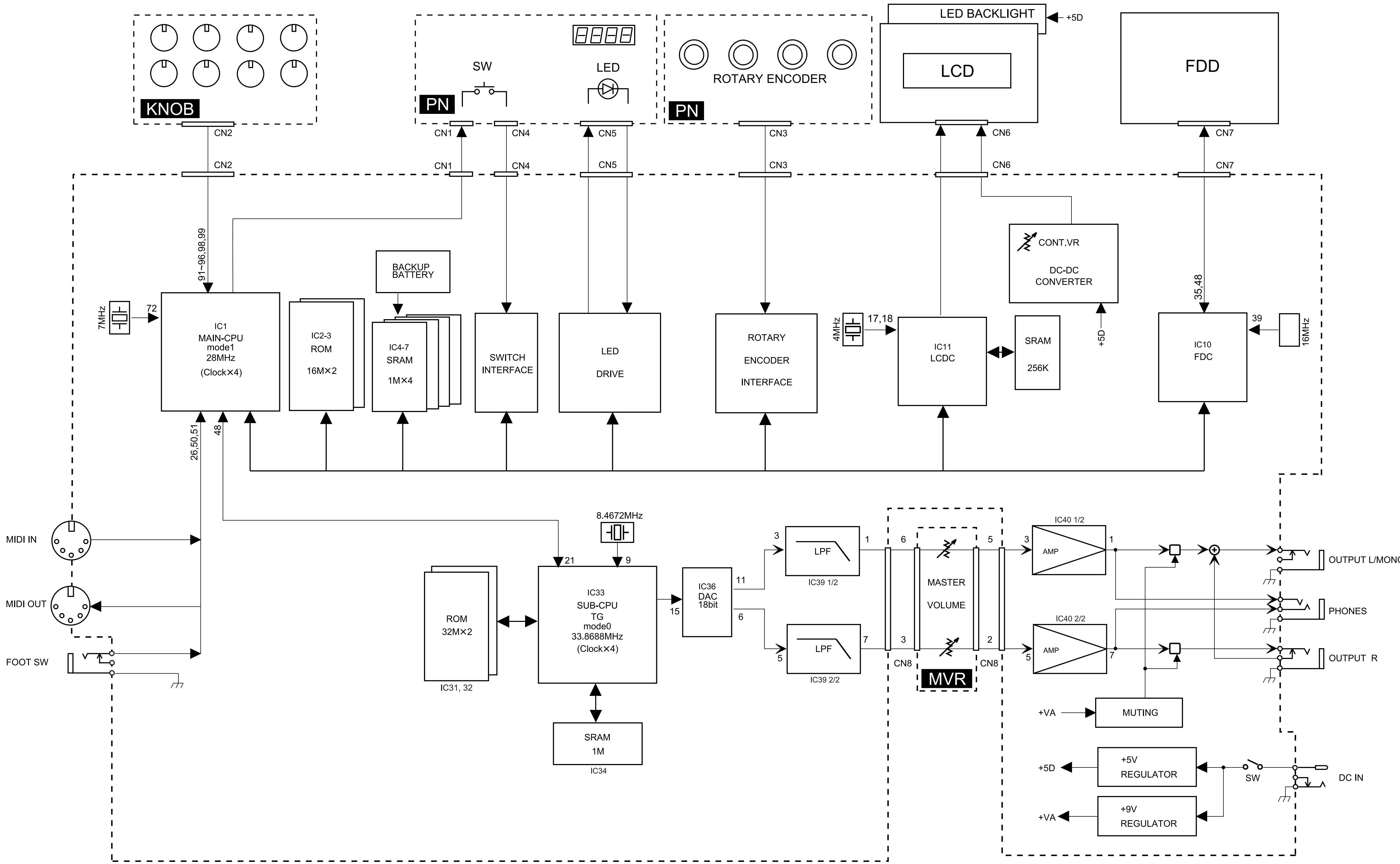

- **SN74HC245NSR**(XD838A00)
  Octal 3-State Bus Transceiver




- **TC74S66F (XR682A00)**
  Bilateral Switch



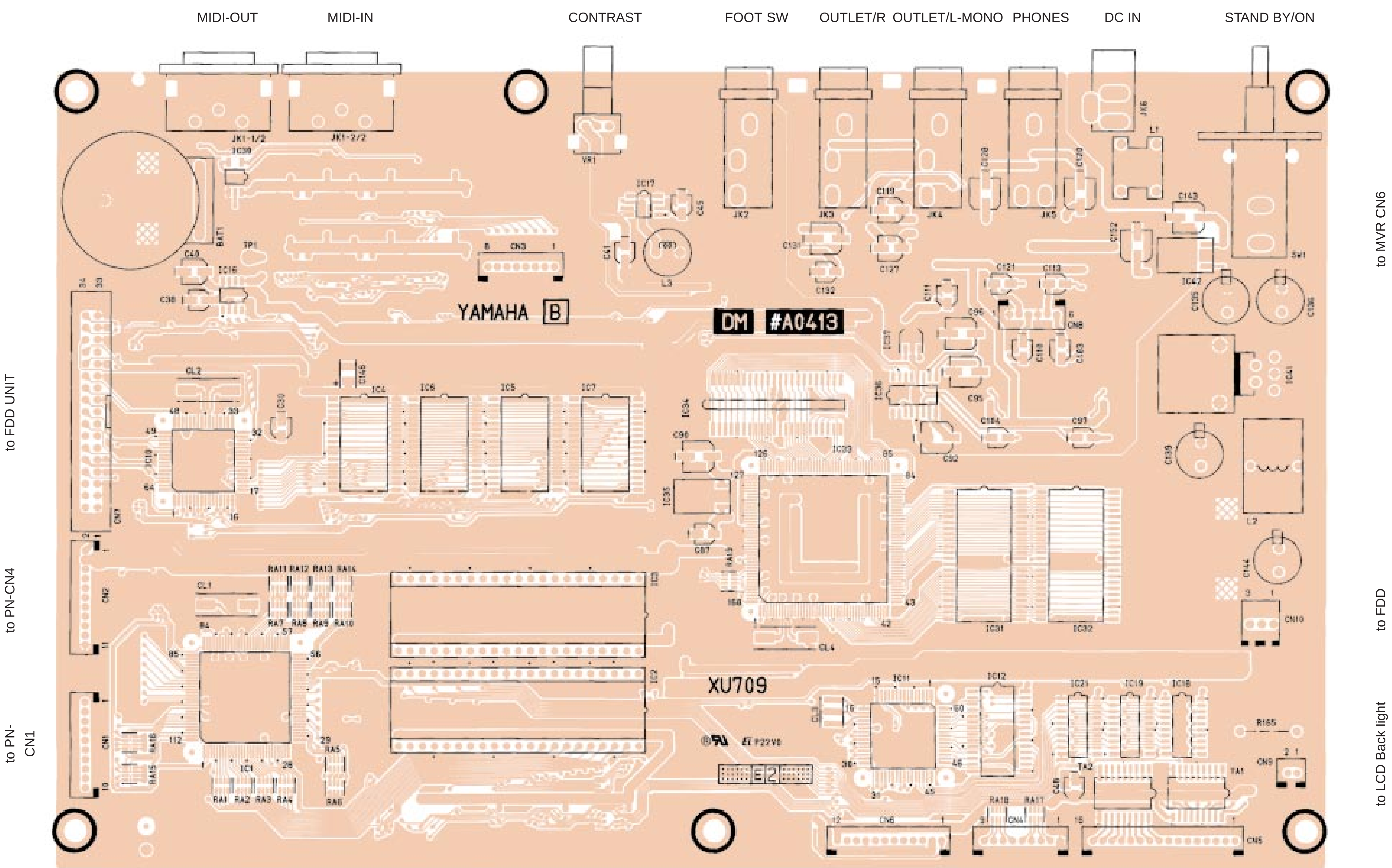
## ■ BLOCK DIAGRAM




28CA1-8812706

## ■ CIRCUIT BOARDS

### • DM Circuit Board

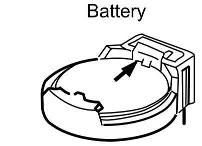



Component side

**Battery VS246400**

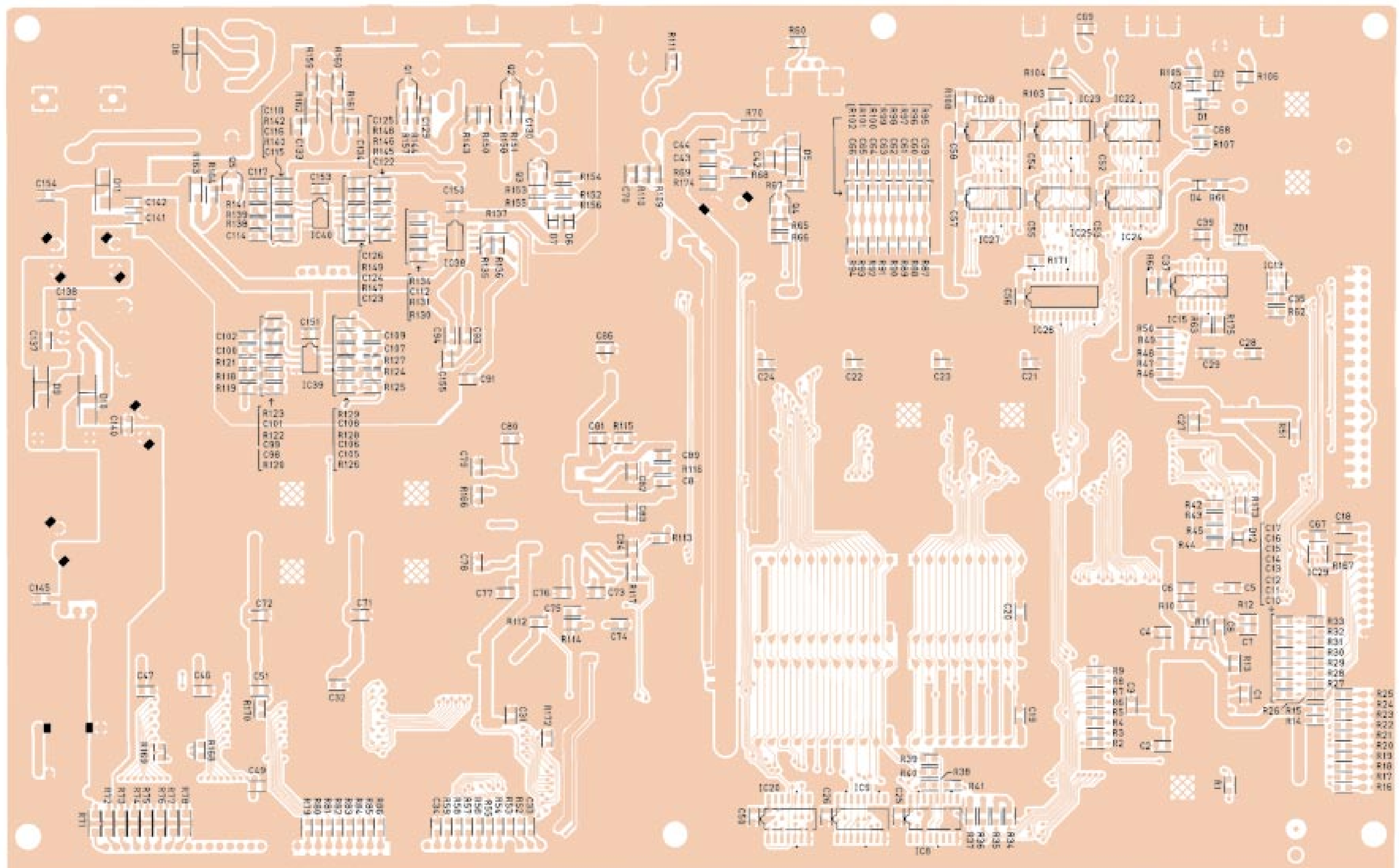
VS246300 (Battery holder for VS246400)

- Notice for back-up battery removal push the battery as shown in figure, then the battery will pop up.
- Druk de batterij naar beneden zoals aangeven in de tekening, de batterij springt dan naar voren.



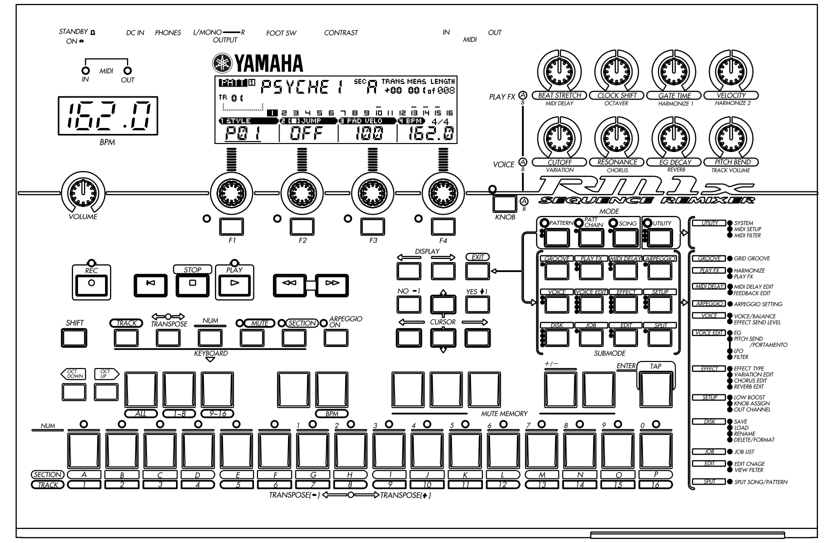

DM:2NA-V260480 2

• **DM Circuit Board**



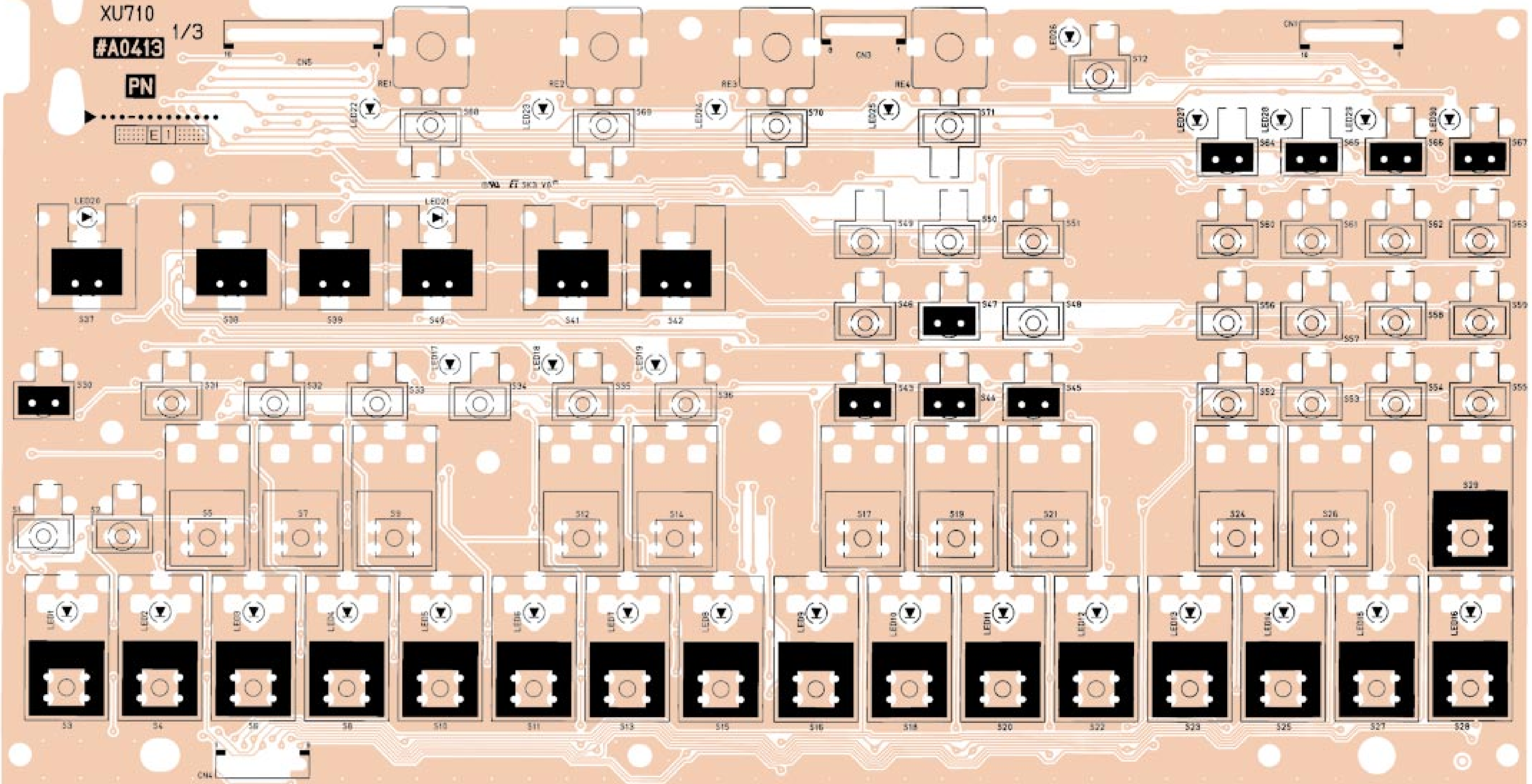
Patternside

- **PN 1/3Circuit Board**




Note: See parts list for details of circuit board component parts.
See PANEL SWITCH TABLE on C2 of OVERALL CIRCUIT DIAGRAM.

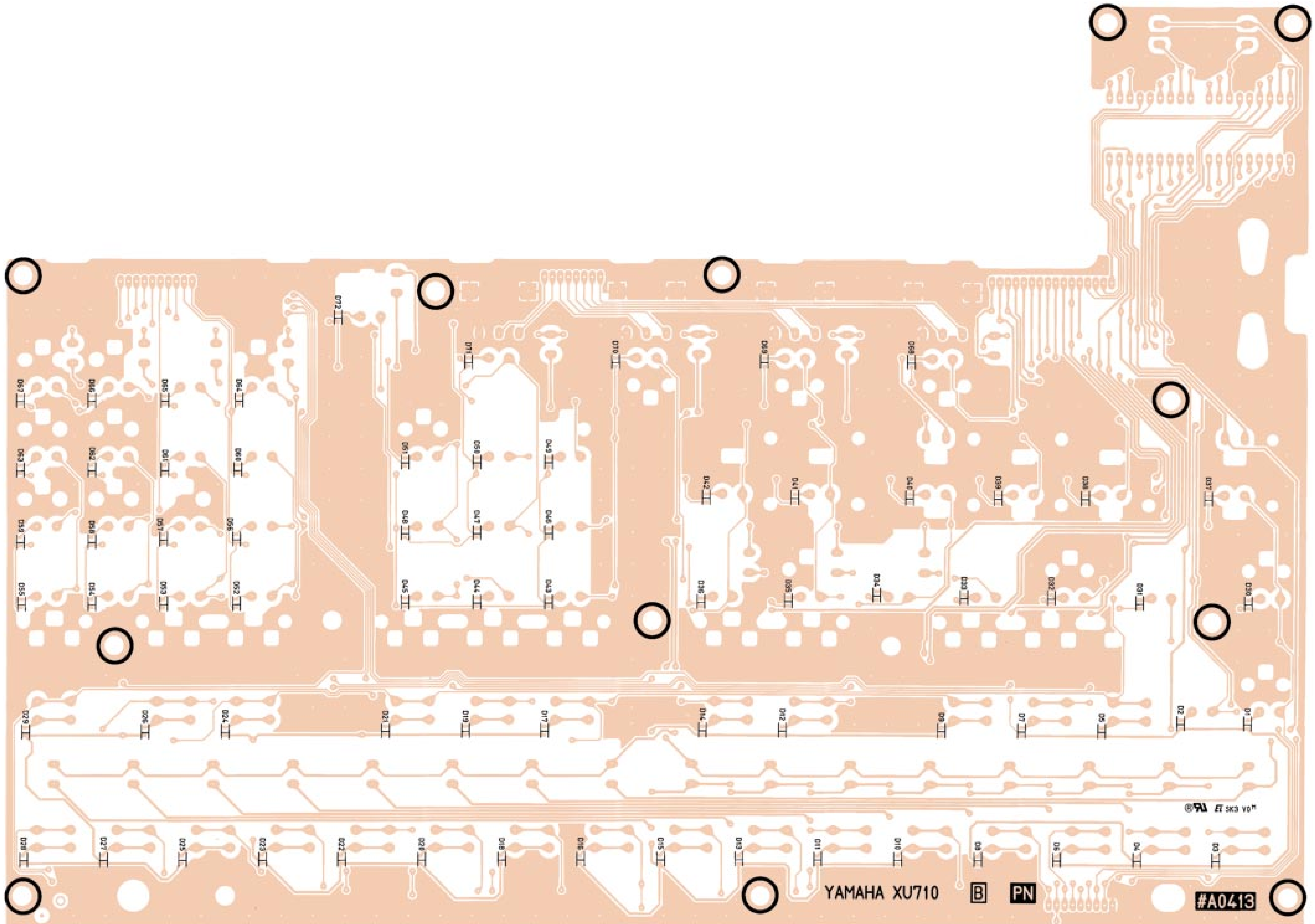
to DM-CN5 to DM-CM3 to DM-CN1




to DM-CN4

Component side

• **PN 1/3Circuit Board**

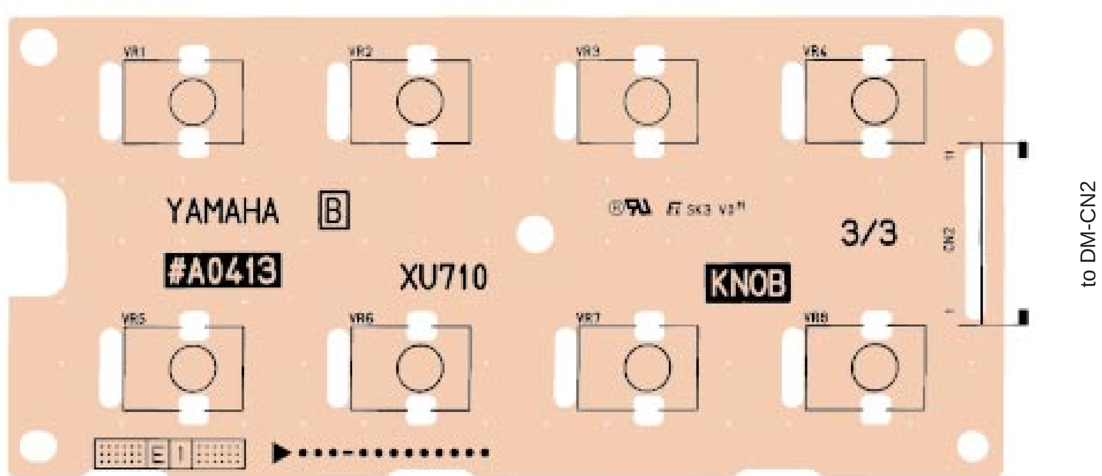



Patternside

PN: 2NA-V260490 ⚠2

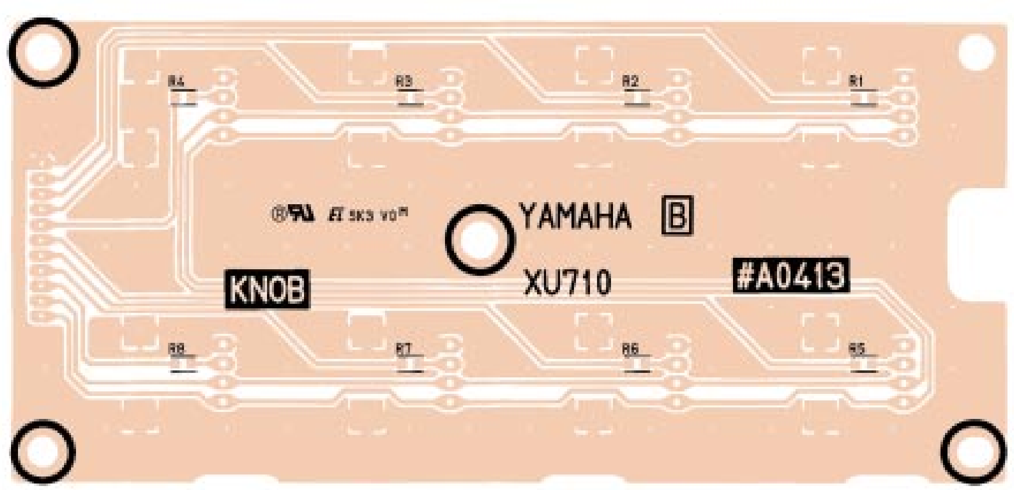
- **PN 2/3 Circuit Board**







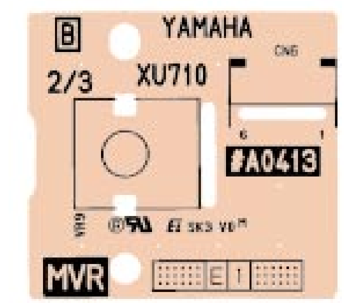

Component side



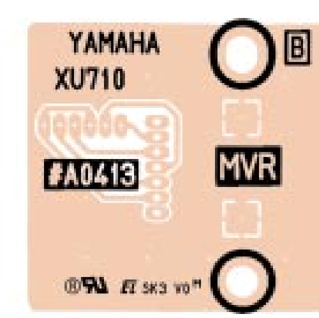

Patternside

- **PN 3/3 Circuit Board**






Component side




Patternside

Note: See parts list for details of circuit board component parts.
See PANEL SWITCH TABLE on C2 of OVERALL CIRCUIT DIAGRAM.

PN:2NA-V260490 2

# ■ TEST PROGRAM & INITIALIZE

## 1.TEST PROGRAM

### ●PREPARATIONS

Measuring instruments: low frequency oscillator, frequency counter, oscilloscope, volt meter (JIS- C curve), keyboard amplifier, etc.

Jigs: MIDI cable, floppy disk (2HD, formatted), etc.

### ●TEST PROGRAM

| TEST No. | TEST | TEST RESULT |
|---|---|---|
| A | How to enter the test program | |
| B | Proceeding through the tests | |
| C | Test program | |
| C- 1 | SYSTEM RAM | OK / NG |
| C- 2 | RAM Battery | OK |
| C- 3 | LCD | Vertical Stripes (by seconds) |
| C- 4 | LED light up | Red, green |
| C- 5 | Panel switch | ON / OFF |
| C- 6 | Encoder 1 | OK, 0-30-0-30 |
| C- 7 | Encoder 2 | OK, 0-30-0-30 |
| C- 8 | Encoder 3 | OK, 0-30-0-30 |
| C- 9 | Encoder 4 | OK, 0-30-0-30 |
| C-10 | Knob 1 | OK, 64-128-0-64 |
| C-11 | Knob 2 | OK, 64-128-0-64 |
| C-12 | Knob 3 | OK, 64-128-0-64 |
| C-13 | Knob 4 | OK, 64-128-0-64 |
| C-14 | Knob 5 | OK, 64-128-0-64 |
| C-15 | Knob 6 | OK, 64-128-0-64 |
| C-16 | Knob 7 | OK, 64-128-0-64 |
| C-17 | Knob 8 | OK, 64-128-0-64 |
| C-18 | FOOT SW | OK, 0-1-0 |
| C-19 | FDD | OK |
| C-20 | MIDI IN / OUT | OK |
| C-21 | WAVE ROM | OK |
| C-22 | PCM sine wave sound OUTPUT (L) | OUTPUT (L): +2 +/- 2 dBm load 10 kohm |
| | | OUTPUT (R): less than -76 dBm |
| | | PHONES (L): -5 +/- 2 dBm load 33 ohm |
| | | PHONES (R): less than -68 dBm |
| C-23 | PCM sine wave sound OUTPUT (R) | OUTPUT (R): +2 +/- 2 dBm load 10 kohm |
| | | OUTPUT (L): less than -76 dBm |
| | | PHONES (R): -5 +/- 2 dBm load 33 ohm |
| | | PHONES (L): less than -68 dBm |
| C-24 | Factory Set | |
| C-25 | EXIT | |
| | | * Noise level |
| | | OUTPUT (L), OUTPUT (R): |
| | | less than -78 dBm |
| | | PHONES (L), PHONES (R): |
| | | less than -78 dBm |

*Note) OUTPUT (L) and OUTPUT (R) are occasionally abbreviated as L and R.

## A. HOW TO ENTER THE TEST PROGRAM

While pressing the [PATTERN], [PATT CHAIN] and [UTIL] buttons, turn the power switch on.
The following message will appear on the LCD.

```
**RM1x   TEST**
   MAIN Ver #.##
   SUB   Ver #.##

   [F1]:AUTO
   [F2]:MANUAL
   [F3]:Factory Set
   [F4]:Exit
```

Use the [F1], [F2], [F3] and [F4] switches to select the appropriate test mode.
When the [F1] switch is pressed, the auto mode test is entered.
When the [F2] switch is pressed, the manual mode test is entered.
The [F3] switch is pressed, the "C-24 Factory Set" is started.
The [F4] switch is pressed, the "C-25 EXIT" is started.

## B. PROCEEDING THROUGH THE TESTS

### Auto Mode

When the auto mode test is entered, the following display will appear:

```
**RM1x   TEST** AUTO
   MAIN Ver #.##
   SUB   Ver #.##

   01:RAM R/W

   [F4]:Exit
```

Use the [+1] and [-1] switches to select the appropriate test number.
When the [ENTER] switch is pressed, the test is sequentially executed from the selected test number.
When the [ENTER] switch is pressed without setting anything, the test is automatically executed from "C-1 RAM".
The error message is displayed when an error occurs and the test stops.
In this case, the error is processed with either of the [ENTER], [+1] or [F4] switches.
When the [ENTER] switch is pressed, the test is automatically executed again from the test where the error occurs.
When the [+1] switch is pressed, the test is automatically executed from the test where the error occurs.
The [F4] switch is pressed, the "C-25 EXIT" is started.

### Manual Mode

When the manual mode test is enterd, the following display will appear:

```
**RM1x   TEST**MANUAL
   MAIN Ver #.##
   SUB   Ver #.##

   01:RAM R/W

   [F4]:Exit
```

Use the [+1] and [-1] switches to select the appropriate test number.
When the [ENTER] switch is pressed, the test of the selected number is executed.
The [F4] switch is pressed, the "C-25 EXIT" is started.

### Test Selection When An Error Is Detected

In each test, if "NG" (No Good) error is detected, pressing [F4] switch will make the undermentioned.
You can then retry the test or another test.

Auto Mode ---------->error processing state
Manual Mode ------->test number waiting state

However, this method does not correspond at the test of "C-5 PANEL SWITCH".

## C. TEST PROGRAM

This test program explains the manual mode.

### C-1 SYSTEM RAM READ / WRITE TEST

```
01: RAM R/W
```

This is the read/write check for the MAIN CPU RAM. The test result appears on the LCD.

### Display Of Test Results

OK

```
01: RAM R/W
                OK
```

NG

```
01: RAM R/W
                NG
```

**Test End**

After displaying the test result and the test will be finished.
All the RAM data will be restored.
Press the [F4] switch to exit the test, press the [+1] switch to proceed with the next test and then the [ENTER] switch to execute the next test.

## C-2 RAM BATTERY TEST

| |
|---|
| 02: RAM Battery |

This test checks that the voltage of the RAM backup battery is greater than 2.9V and less than 3.5V at the A / D input terminal of CPU.
The "OK" will be displayed when the voltage is within the range.

**Display Of Test Results**

| | |
|---|---|
| OK | 02: RAM Battery<br>3.2V OK |
| NG | 02: RAM Battery<br>#.#V Low NG |
| | 02: RAM Battery<br>#.#V High NG |

**Test End**

Displays the test result and ends the test.
Press the [+1] switch to proceed with the next test and then the [ENTER] switch to execute the next test.

## C-3 LCD ALL ON / OFF TEST

| |
|---|
| 03: LCD Check |

Confirm that all LCD dots blink. Each line should blink in one (1) second intervals.
Confirm that the LCD dots light normally.
Confirm that the LCD contrast changes when rotating the contrast adjustment volume.

**Display Of Test Results**

Not appearing

**Test End**

Press the [F4] switch to end the test.
Press the [+1] switch to proceed with the next test and then the [ENTER] switch to execute the next test.

## C-4 LED ON / OFF TEST

| |
|---|
| 04: LED Check |

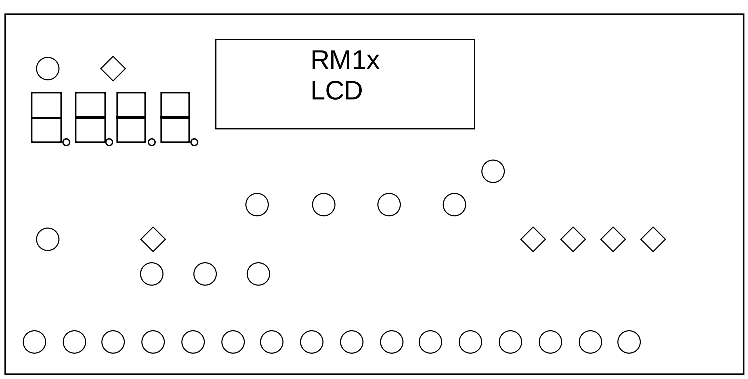
Confirm that LED lights on and off sequentially from the left of Fig. 1 and all LED's light on and off at the same time.
The above-mentioned procedure are repeated until being interrupted.

**Display Of Test Results**

Not appearing

**Test End**

Press the [F4] switch to ends the test.
Press the [+1] switch to proceed with the next test and then the [ENTER] switch to execute the next test.




(Fig. 1 )

Notes) ○ mark is red LED, ◇ mark is green LED, ⊟ mark is 7- Seg. LED

## C-5 PANEL SWITCH TEST

| 05: Panel Switch |
|---|

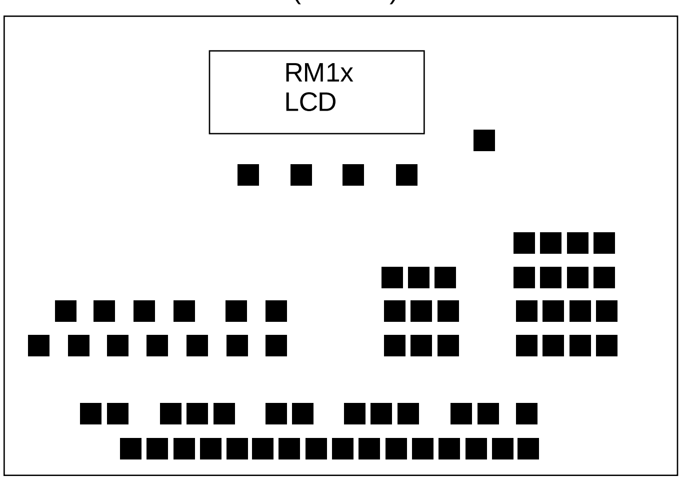
Press the panel switches consecutively from the [F1] switch to the [ENTER] switch, according to the order indicated by the LCD. Confirm all switches are working properly.
Confirm the 32 channel sounds generate.

| 05: Panel Switch<br>Push [MODE ] |
|---|

When it is normal, a piano tone is generated while being press on the switch.
NG is displayed when another switch is pressed and a piano tone does not generate. After this, the test advances to the next switch test when a correct switch is pressed.
The test result is displayed if all switches are normal.
Assume that the operation of 32CH was confirmed when 32 times the sound generates continuously.
The order of the switch check and the pitches are shown in the Table 1 and Fig. 2.

| Switch | Pitch | Switch | Pitch | Switch | Pitch | Switch | Pitch |
|---|---|---|---|---|---|---|---|
| F1 | C 3 | UP | G 3 | OCT UP | $E^{b}2$ | $D^{b}4$ | $D^{b}4$ |
| F2 | D 3 | INC/YES | A 3 | E 2 | E 2 | D 4 | D 4 |
| F3 | E 3 | LEFT | B 3 | F 2 | F 2 | $E^{b}4$ | $E^{b}4$ |
| F4 | F 3 | DOWN | C 4 | $G^{b}2$ | $G^{b}2$ | E 4 | E 4 |
| KNOB | G 3 | RIGHT | D 4 | G 2 | G 2 | F 4 | F 4 |
| REC | C 3 | PATTERN | C 3 | $A^{b}2$ | $A^{b}2$ | TAP | $G^{b}4$ |
| TOP | D 3 | PATT CHAIN | D 3 | A 2 | A 2 | | |
| STOP | E 3 | SONG | E 3 | $B^{b}2$ | $B^{b}2$ | | |
| PLAY | F 3 | UTILITY | F 3 | B 2 | B 2 | | |
| BWD | G 3 | GROOVE | G 3 | C 3 | C 3 | | |
| FWD | A 3 | PLAY FX | A 3 | $D^{b}3$ | $D^{b}3$ | | |
| SHIFT | C 3 | MIDI DELAY | B 3 | D 3 | D 3 | | |
| TRACK | D 3 | ARPEGGIO | C 4 | $E^{b}3$ | $E^{b}3$ | | |
| TRANSPOSE | E 3 | VOICE | D 4 | E 3 | E 3 | | |
| NUM | F 3 | VOICE EDIT | E 4 | F 3 | F 3 | | |
| MUTE | G 3 | EFFECT | F 4 | $G^{b}3$ | $G^{b}3$ | | |
| SECTION | A 3 | SETUP | G 4 | G 3 | G 3 | | |
| ARPEGGIO ON | B 3 | DISK | A 4 | $A^{b}3$ | $A^{b}3$ | | |
| DISP LEFT | C 3 | JOB | B 4 | A 3 | A 3 | | |
| DISP RIGHT | D 3 | EDIT | C 5 | $B^{b}3$ | $B^{b}3$ | | |
| EXIT | E 3 | SPLIT | D 5 | B 3 | B 3 | | |
| DEC/NO | F 3 | OCT DOWN | D 2 | C 4 | C 4 | | |

(Table 1)




(Fig. 2)

Notes) Make sure all switches marked ■ are working properly.

### Display Of Test Results

NG

```
05: Panel Switch
Push [MODE ]        NG
```

### Test End

After displaying the test result when the check to the [TAP] switch end and the test will be finished.
After Pressing the [F4] to exit the test, press the [+1] switch to proceed with the next test and then the [ENTER] switch to execute the next test.
Refer to "B PROCEEDING THROUGH THE TESTS" if the "NG" occurs while testing.

## C-6 ENCODER 1 [F1] TEST

```
06: Encoder 1
RIGHT    00
```

Confirm the Encoder corresponding to the [F1] switch are working properly from the left side.
When you rotate the Encoder clockwise according to the LCD display, the value at the right of the LCD simply increases from 0 to 30. When you rotate the Encoder counterclockwise, the value at the right of the LCD simply increases from 0 to 30. After that, confirm that the OK appears on the LCD.

```
06: Encoder1
RIGHT    xx
```

```
06: Encoder1
LEFT     xx
```

(where xx= current ENCODER 1 value)

### Display Of Test Results

OK

```
06: Encoder1
LEFT     00          OK
```

NG    Not appearing

### Test End

After displaying the test result and the test will be finished.
After Pressing the [F4] to exit the test, press the [+1] switch to proceed with the next test and then the [ENTER] switch to execute the next test.
Refer to "B PROCEEDING THROUGH THE TESTS" if the "NG" occurs while testing.

## C-7 ENCODER 2 [F2] TEST
## C-8 ENCODER 3 [F3] TEST
## C-9 ENCODER 4 [F4] TEST

These tests can be performed in the same manner as the test C-6, "ENCODER 1 [F2] TEST".

## C-10 KNOB 1 (BEAT STRETCH) TEST

```
10: Knob 1
xxx   64
```

(where xxx= current KNOB 1 value)

According to the target value displayed on the LCD, slowly rotate the KNOB 1.
Check that the value changes from 64 to 128 then to 00 and back to 64 (in other words, center to top then to bottom and back to center). After that, confirm that the "OK" appears on the LCD.

```
10: Knob 1
xxx   yyy
```

(where xxx= current KNOB 1 value and yyy= target value)

### Display Of Test Results

OK

```
10: Knob1
064    064          OK
```

NG    Not appearing

When the value of the display passes 64 after 64-128-00 and passes 64 , OK is displayed.

### Test End

After displaying the test result and the test will be finished.
After Pressing the [F4] to exit the test, press the [+1] switch to proceed with the next test and then the [ENTER] switch to execute the next test
Refer to "B PROCEEDING THROUGH THE TESTS" if the "NG" occurs while testing.

## C-11 KNOB 2 (CLOCK SHIFT) TEST
## C-12 KNOB 3 (GATE TIME) TEST
## C-13 KNOB 4 (VELOCITY) TEST
## C-14 KNOB 5 (CUTOFF) TEST
## C-15 KNOB 6 (RESONANCE) TEST
## C-16 KNOB 7 (EG DECAY) TEST
## C-17 KNOB 8 (PITCH BEND) TEST

These tests can be performed in the same manner as the test C-10,"KNOB 1 (BEAT) TEST"

## C-18 FOOT SW TEST

```
18: FOOT SW
0
```

Connect a foot switch and press it on and off.
Check that the display on the LCD changes from off to on then back to off and verify that to the "OK" result is displayed.

### Display Of Test Results

OK

```
18: FOOT SW
1                OK
```

NG  Not appearing

### Test End

After displaying the test result the test will be finished.
After pressing the [F4] to exit the test, press the [+1] switch to proceed with the next test and then the [ENTER] switch to execute the next test.
Refer to “B PROCEEDING THROUGH THE TESTS” if the “NG” occurs while testing.

## C-19 FDD TEST

```
19:              FDD
(WRITE/READ)
```

Insert the floppy disk (2HD, formatted) which is set to “protect off” position. Press the [ENTER] to execute the write/read test by using the test two pattern.
Confirm that “OK” is displayed.

### Display Of Test Results

OK

```
19:FDD (WRITE/READ)
                OK
```

NG

```
19:              FDD
(WRITE/READ)
```

### Error Code

RDERR : Read error
WRERR : Write error
NODSK : No disk (FD is not installed)
UNFORM : Unformat (FD is unformatted)
WRPRT : Write protect

### Test End

After displaying the test result and the test will befinished.
After pressing the [F4] to exit the test, press the [+1] switch to proceed with the next test and then the [ENTER] switch to execute the next test.
Refer to “B PROCEEDING THROUGH THE TESTS” if the “NG” occurs while testing.

## C-20 MIDI IN/OUT TEST

```
20: MIDI (IN/OUT)

```

After connecting the MIDI IN to the MIDI OUT via- a MIDI cable, execute the test.
The test result appears on the LCD.

### Display Of Test Results

OK

```
20: MIDI (IN/OUT)
                OK
```

NG

```
20: MIDI (IN/OUT)
                NG
```

TIME OUT ERROR

```
20: MIDI (IN/OUT)
           TIMEOUT
```

(When the reception does not end within the fixed time)

### Test End

After displaying the test result the test will be finished.
Press the [+1] switch to proceed with the next test and then the [ENTER] switch to execute the next test.
Refer to “B PROCEEDING THROUGH THE TESTS” if the “NG” occurs while testing.

## C-21 WAVE ROM TEST

```
21: WAVE ROM

```

Confirm that the read test of the “WAVE ROM” and the display of OK appears.

### Display Of Test Results

OK

```
21: WAVE ROM
                OK
```

NG

```
21: WAVE ROM
                NG
```

### Test End

After displaying the test result the test will be finished.
After pressing the [F4] to exit the test, press the [+1] switch to proceed with the next test and then the [ENTER] switch to execute the next test.

## C-22 PCM SOUND OUTPUT (OUTPUT L) TEST

```
22: PCM SIN 1kHz L

```

The VOLUME control must be set at maximum.
Insert the appropriate phone plugs into each output jack and check the OUTPUT (L, R), PHONES (L, R) outputs.
If necessary, verify the frequency, output waveform and output level of each output using a frequancy countor, oscilloscope and AC voltmeter (with JIS-C filter). Listed below are the specifications and conditions of each output during this test.

OUTPUT (L) : 1 kHz +/- 3.0 Hz, Sine wave
+2 +/- 2 dBm (10 kHz load),
Distortion : less than 0.5%
OUTPUT (R) : less than -76 dBm
PHONES (L) : 5 +/- 2 dBm (33 ohm load),
Distortion : less than 0.5%
PHONES (R) : less than -68 dBm

The LCD display during the sound output.

```
22: PCM SIN 1kHz L
                ON
```

**Display Of Test Results**
Not appearing

**Test End**
Press the [F4] switch to finish the test.
After press the [F4] switch to exit the test, press the [+1] switch to proceed with the next test and then the [ENTER] switch to execute the next test.

## C-23 PCM SINE WAVE 1kHz OUTPUT (R) TEST

```
23: PCM SIN 1kHz R
```

The VOLUME control must be set at maximum. Insert the appropriate phone plugs into each output jack and check the OUTPUT (L, R), PHONES (L, R) outputs. If necessary, verify the frequency, output waveform and output level of each output using a frequancy countor, oscilloscope and AC voltmeter (with JIS-C filter). Listed below are the specifications and conditions of each output during this test.

OUTPUT (R) : 1 kHz +/- 3.0 Hz, Sine wave
+2 +/- 2 dBm (10 kHz load),
Distortion : less than 0.5%
OUTPUT (L) : less than -76 dBm
PHONES (R) : 5 +/- 2 dBm (33 ohm load)
Distortion : less than 0.5%
PHONES (L) : less than -68 dBm

The LCD display during the sound output.

```
23: PCM SIN 1kHz R
                ON
```

**Display Of Test Results**
Not appearing

**Test End**
Press the [F4] switch to finish the test.
After press the [F4] to exit the test, press the [+1] switch to proceed with the next test and then the [ENTER] switch to execute the next test.

## C-24. FACTORY SETTINGS

```
24: Factory Set
```

This test is used to initialize the following data to the factory settings.

- System Data
- Song Data
- Sequence data

When this test is executed, the following display will appear.

```
24: Factory Set
     [NO] or [YES] ?
```

[YES] : execute the factory settings.
[NO] : not execute the factory settings.

**Display Of Test Results**
When the factory set is set.

```
24: Factory Set
              OK
```

When the factory set is not set.

```
24: Factory Set
           not set
```

**Test End**
After displaying the test result the test will be finished.
After press the [F4] to exit the test, press the [+1] switch to proceed with the next test and then the [ENTER] switch to execute the next test.

At this time, each data are set as follows.

| | |
|---|---|
| Master Tune fine = | 0 |
| Foot Switch Assign = | Start Stop |
| Pattern Change quantize = | 16's note |
| Memory protect = | OFF |
| LED Display = | BPM display |
| LCD Mode = | POSI |
| MTC Start Offset = | 00:00:00:00 |
| Metronome = | REC |
| Click Beat = | 4's note |
| Interval Time = | 100 ms |
| Edit Event List TG View = | ON |
| MIDI SYNC = | Internal |
| MIDI Control = | Out |
| Echo Back = | Thru |
| MIDI Filter in = | All Receive |
| MIDI Filter out = | All Transmit |
| TG Parameter = | OFF |
| Voice Setup to TG = | ON |

Keyboard Velocity setting = 100
Event Chase = OFF

Setup Mode = Pattern Mode
Song Number = 1
Rec. track = 1

Pattern Number = Preset 001
Section = A
REC MODE = Step Rec. Single Track Recording
Phrase Rec. Loop = ON
Rec. Pre. Count = 1 Ber

Tempo = 120.0 bpm
Rhythm = 4 / 4
Transpose = 0
Jump Type = OFF

### C-25 EXIT

```
25: Exit
```

When the RM1x exits the test program, the RM1X becomes the play mode. When this test is executed, the following display will appear.

```
25: Exit
     [NO] or [YES] ?
```

[YES] : exit the test program.
[NO] : return the test entry mode.

## D. OTHERS

When the power switch is turned ON and OFF, confirm that the clicking noises of the OUTPUT and PHONES are less than 0.5V p-p. When the RM1x exits the test program and returns to play mode, confirm that the noise levels of each output are as follows.
(A JIS-C curve filter is required for the measurements.)

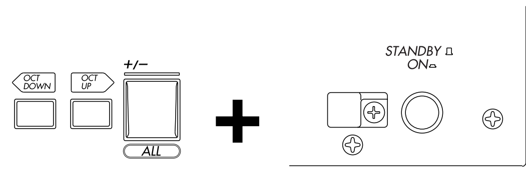
OUTPUT (L) ------------> less than -78 dBm
OUTPUT (R) ------------> less than -78 dBm
PHONES (L) ------------> less than -78 dBm
PHONES (R) ------------> less than -78 dBm

Confirm that the RM1x starts on a usual initial screen when you turn on the power switch again after the Factory Set is executed in "A HOW TO ENTER THE TEST PROGRAM", the power switch is turned off and three minutes or more pass.
When the RAM data are destroyed, "Backup Battey Low" or "Factory Set" is displayed.

## 2. INITIARIZE

If you wish to reset the RM1x's settings to the factory condition, you can perform the Initialization operation.

1 While holding down the [OCT DOWN] and [OCT UP] buttons and the $F^{\#}/G^{b}$ key [ALL] located at their right, turn on the STANDBY/ON switch.




2 When "RM1x" appears in the display, release the keys.

3 When initialization has been performed, "Factory Set" appears briefly in the display.

### CAUTION!

When initialization is performed, all internal memory will be erased. If you wish to keep any of your data, you must save it to floppy disk before initializing.

# ERROR MESSAGES

## ● Monitor

| | |
|---|---|
| No Data | When a job is executed, this will appear if the selected track or area contains no data, making the job invalid. Re-select the area. |
| Illegal Input | This will appear in response to inappropriate operation or input. Check your input method. |
| Illegal Track Number | An unavailable or otherwise improper track number has been specified. Select a different track. |
| Illegal Phrase Number | An unavailable or otherwise improper phrase number has been specified. Select a different phrase. |
| Illegal Measure | An unavailable or otherwise improper measure number has been specified. Select a different measure number. |
| Illegal Check Box | This message will appear if no check boxes are checked in any of the corresponding track jobs. At least one check box must be checked. |
| No F7 (End of Exc.) | This message indicates that no “End of Exclusive” byte (F7) was included with a MIDI exclusive data entry or edit. Be sure to include F7. |
| Preset Phrase | This will appear when you attempt to edit a Preset Phrase. If you wish to edit a preset phrase, you must first copy it to a User Phrase. |
| Preset Pattern | This will appear when you attempt to record to a Preset Pattern. You cannot record to Preset Patterns. |
| Pattern Length Mismatch | A job has resulted in a pattern having more than the maximum of 256 measures. |
| Phrase Number Overflow | All available user phrases (256 maximum) have been used up when recording, executing a job, or editing. |

## ● System

| | |
|---|---|
| Backup Battery Low | This will appear when the internal backup battery of the RM1x has run down. Replace the battery to a new one. |
| Memory Full | This will appear when internal memory is full and it is not possible to record, edit, execute a job, receive MIDI, or load from floppy disk. Delete unneeded songs, patterns, or user phrases, and try the operation once again. |
| Factory Set | After the power is switched ON, a system diagnosis is run on the RM1x’s system. If the diagnosis finds the RAM to be defective, this message will appear and the memory will be reset to its original factory settings. Data for User Song, User Patterns, and User Phrases will all be eliminated. |
| Memory Protect | You have attempted to execute a recording, editing, or job function when the UTILITY mode Memory Protect function is ON. |

## ● MIDI

| | |
|---|---|
| Exc. Adrs Error | This appears when the received Exclusive data contains an address error. |
| Exc. Data Error | This appears when the received Exclusive data contains a data size error. |
| MIDI Buffer Full | This will appear when the MIDI reception buffer of the RM1x has filled up, and processing is not possible. Try decreasing the amount of data or increasing the interval time and transmit the data once again. |

● **Disk**

| | |
|---|---|
| Disk Full | This will appear if the floppy disk is full and has no room to save the file. Either use a new floppy disk, or delete unneeded files before trying the operation once again. |
| File Not Found | When loading, this will appear if the specified file does not exist in the floppy disk. Insert the disk once again, and try the operation again. |
| Bad Disk Format Now? (Y/N) | The floppy disk is faulty. Press the [Yes +1] button to format the disk. |
| No Disk | This indicates that the floppy disk is not correctly inserted into the RM1x. Insert the floppy disk correctly. |
| Unformat Format Now? (Y/N) | This will appear if the floppy disk is not formatted. Press the [Yes +1] button to format the disk. |
| Write Protected | This will appear if the write-protect slider of the floppy disk is in the write prohibit position. Remove the floppy disk, close the write-protect slider, and try the operation once again. |
| Bad File | This will appear when you attempt to load a defective file. |
| Illegal Format | This will appear if the floppy disk is of a format which the RM1x is not able to handle. Check the contents of the disk. |
| Disk Changed | This will appear if you have exchanged disks when you should not have. Try the operation once again from the beginning. |
| Can't Change File Name | When renaming, this will appear if the floppy disk already contains a file with a name identical to the specified filename. Specify a different filename. |
| Illegal File | When loading, this will appear if the specified file cannot be handled by the RM1x. Check the contents of the file. |
| No Data | When saving data to floppy disk, this will appear if the selected song or style contains no data, and the save operation is invalid. Select a different song or style. |

● **Messages other than error messages**

| | |
|---|---|
| Can't Undo. Ok? (Y/N) | If executing a job would fill up the internal memory so that Undo will not be available, this message will appear. If you are sure that you will not need to Undo this job, press the [YES +1] button. To cancel without executing the job, press the [NO -1] button, and delete unneeded songs, patterns, or user phrases before trying the operation once again. |
| Are you sure? (Y/N) | Before an operation is executed, this message will ask you for confirmation. Use the [YES +1]/[NO -1] button to either cancel or execute. |
| Completed | This will appear when the current process has been completed. Press any button and the message will disappear. |
| Executing... | When loading, saving, or formatting, this message will appear while the job is being executed. Please wait. |

## ■CONFIRMATION OF MIDI DATA

If you want to confirm the MIDI data, you can see them on the owner's manual or PDF service manual.

YAMAHA [ Music Sequencer --- voice part ] Date:08-SEP-1998
Model RMlx MIDI Implementation Chart Version : 1.0

| Function ... | | Transmitted | Recognized | Remarks |
|---|---|---|---|---|
| Basic Channel | Default<br>Changed | 1 - 16<br>1 - 16 | 1 - 16<br>1 - 16 | Memorized |
| Mode | Default<br>Messages<br>Altered | 3<br>x<br>************** | 1<br>1 - 4(m=1) *1<br>x | Memorized |
| Note Number | : True voice | 0 - 127<br>************** | 0 - 127<br>0 - 127 | Transpose |
| Velocity | Note ON<br>Note OFF | o 9nH,v=1-127<br>x 9nH,v=0 | o v=1-127<br>x | |
| After Touch | Key's<br>Ch's | x<br>x | x<br>x | |
| Pitch Bend | | x | o 0-24 semi | |
| Control Change | 0,32<br>1,64,66,67,84<br>5,7,10,11,65<br>6,38<br>16<br>1-31,33-119<br>71-76<br>91,93,94<br>96,97<br>98,99<br>100,101 | o *2<br>x<br>o *2<br>o *2<br>x<br>o<br>o<br>o *2<br>x<br>x<br>o *2 | o<br>o<br>o<br>o<br>o<br>o<br>x<br>o<br>o<br>o<br>o | Bank Select<br><br><br>Data Entry<br>Assignable Cntrl<br>Assignable Knob<br>Sound Controller<br>Effect SendLevel<br>Data Inc,Dec<br>NRPN LSB,MSB<br>RPN LSB,MSB |
| Prog Change | : True # | o 0 - 127<br>*********** | o 0 - 127<br>0 - 127 | |
| System Exclusive | | o | o | |
| Common | : Song Pos.<br>: Song Sel.<br>: Tune | x<br>x<br>x | x<br>x<br>x | |
| System Real Time | :Clock<br>:Commands | x<br>x | x<br>x | |
| Aux Mes-sages | : All Sound Off<br>: Reset All Cntrls<br>: Local ON/OFF<br>: All Notes OFF<br>: Active Sense<br>: Reset | x<br>x<br>x<br>x<br>o<br>x | o<br>o<br>x<br>o(123-127)<br>o<br>x | |

Notes:*1 m is always treated as "1" regardless of its value.
*2 transmit if TG parameter out sw is on.

Mode 1 : OMNI ON, POLY Mode 2 : OMNI ON, MONO o : Yes
Mode 3 : OMNI OFF, POLY Mode 4 : OMNI OFF, MONO x : No

YAMAHA [ Music Sequencer --- sequencer part ] Date:08-SEP-1998
Model RMlx MIDI Implementation Chart Version : 1.0

| Function ... | | Transmitted | Recognized | Remarks |
|---|---|---|---|---|
| Basic Channel | Default<br>Changed | 1 - 16<br>x | 1 - 16<br>x | Memorized |
| Mode | Default<br>Messages<br>Altered | x<br>x<br>************** | x<br>x<br>x | |
| Note Number | : True voice | 0 - 127<br>************** | 0 - 127 | |
| Velocity | Note ON<br>Note OFF | o 9nH,v=1-127<br>x 9nH,v=0 | o v=1-127<br>x | |
| After Touch | Key's<br>Ch's | o<br>o | o<br>o | |
| Pitch Bend | | o | o | |
| Control Change | 0-121 | o | o | |
| Prog Change | : True # | o 0 - 127<br>*********** | o 0 - 127 | |
| System Exclusive | | o | o | |
| Common | : Song Pos.<br>: Song Sel.<br>: Tune | o *2<br>o *2<br>x | o *1<br>o *1<br>x | |
| System Real Time | :Clock<br>:Commands | o *2<br>o *2 | o *3<br>o *1 | |
| Aux Mes-sages | : All Sound Off<br>: Reset All Cntrls<br>: Local ON/OFF<br>: All Notes OFF<br>: Active Sense<br>: Reset | o<br>o<br>o<br>x<br>x<br>x | o<br>o<br>o<br>x<br>x<br>x | |

Notes:*1 if MIDI control is in or in/out
*2 if MIDI control is out or in/out
*3 if MIDI sync is external
send MMC (stop,deffered play,locate) if sync mode is MTC.
receive MTC quarter frame message if sync mode is MTC.

Mode 1 : OMNI ON, POLY Mode 2 : OMNI ON, MONO o : Yes
Mode 3 : OMNI OFF, POLY Mode 4 : OMNI OFF, MONO x : No

# MIDI DATA FORMAT

The RM1x tone generator and sequencer blocks handle different MIDIevents. These are listed seqparately in the MIDI Data Format as well as in the MIDI Implementation Chart.

n Tone generator block (Voice part)
(1) TRANSMIT FLOW

```
      SW1
MIDI <-[]---+---            NOTE ON/OFF            9nH
 OUT  |       |SW2
      |       +[]-          KNOB 1-8   EnH, BnH,01H-77H(except 20H)
      |       |SW3
      |       +[]-          FOOT SW   Bn,40H 42H
      |
      |-----+--- SYSTEM EXCLUSIV MESSAGE
      |       |            <PARAMETER CHANGE>
      |       |------- MIDI MASTER TUNING          F0H 43H 1nH 27H 30H 00H 00H mmH llH ccH F7H
      |       |------- XG SYSTEM        F0H 43H 1nH 4CH aaH aaH aaH ddH.....ddH F7H
      |       |------- MULTI EFFECT     F0H 43H 1nH 4CH aaH aaH aaH ddH.....ddH F7H
      |       |------- MULTI PART       F0H 43H 1nH 4CH aaH aaH aaH ddH.....ddH F7H
      |
      |-----+--- SYSTEM EXCLUSIV MESSAGE
                    |          MIDI MASTER VOLUME  F0H 7FH 7FH 04H 01H llH mmH F7H
                    |          IDENTITY REPLY           F0H 7EH 7FH 06H 02H 43H 00H 41H ddH ddH
                    |                                                       00H 00H 00H 01H F7H
                    +---   ACTIVE SENSING              FEH
```

SW1 [] MIDI Transmit Channel
Selected with output MIDI CH.

SW2 [] KNOB 1-8
Selected with the Knob Assign page in the SETUP sub mode.

SW3 [] FOOT SWITCH
Selected with the FOOT SWITCH menu in the UTILITY mode.

## (2) RECEIVE FLOW

```
MIDI ->-+----
IN     |  |
  ------  |
  | --------
  | | SW1
  | |-[]---+---      NOTE OFF                        8nH
  | |    |
  | |    +---        NOTE ON/OFF                     9nH
  | |    |
  | |    +---        CONTROL CHANGE
  | |    |             BANK SEL MSB                  BnH,00H
  | |    |             BANK SEL LSB                  BnH,20H
  | |    |             MODULATION                    BnH,01H
  | |    |             PORTAMENTO TIME               BnH,05H
  | |    |             DATA ENTRY MSB                BnH,06H
  | |    |             DATA ENTRY LSB                BnH,26H
  | |    |             MAIN VOLUME                   BnH,07H
  | |    |             PANPOT                        BnH,0AH
  | |    |             EXPRESSION                    BnH,0BH
  | |    |             AC1 CONTROLLER                BnH,10H
  | |    |             SUSTAIN SWITCH                BnH,40H
  | |    |             PORTAMENTO SWITCH             BnH,41H
  | |    |             SOSTENUTO                     BnH,42H
  | |    |             SOFT PEDAL                    BnH,43H
  | |    |             HARMONIC CONTENT              BnH,47H
  | |    |             RELEASE TIME                  BnH,48H
  | |    |             ATTACK TIME                   BnH,49H
  | |    |             BRIGHTNESS                    BnH,4AH
  | |    |             SOUND CONTROLLER 6            BnH,4BH
  | |    |             SOUND CONTROLLER 7            BnH,4CH
  | |    |             PORTAMENTO CONTROL            BnH,54H
  | |    |             EFFECT SEND LEVEL 1           BnH,5BH
  | |    |             EFFECT SEND LEVEL 3           BnH,5DH
  | |    |             EFFECT SEND LEVEL 4           BnH,5EH
  | |    |             DATA ENTRY INC                BnH,60H
  | |    |             DATA ENTRY DEC                BnH,61H
  | |    |             NRPN
  | |    |               VIBRATO RATE                BnH,63H,01H,62H,08H,06H,mmH
  | |    |               VIBRATO DEPTH               BnH,63H,01H,62H,09H,06H,mmH
  | |    |               VIBRATO DELAY               BnH,63H,01H,62H,0AH,06H,mmH
  | |    |               FILTER CUTOFF FREQ.         BnH,63H,01H,62H,20H,06H,mmH
  | |    |               FILTER RESONANCE            BnH,63H,01H,62H,21H,06H,mmH
  | |    |               AEG ATTACK TIME             BnH,63H,01H,62H,63H,06H,mmH
  | |    |               AEG DECAY TIME              BnH,63H,01H,62H,64H,06H,mmH
  | |    |               AEG RELEASE TIME            BnH,63H,01H,62H,66H,06H,mmH
  | |    |             RPN
  | |    |               PITCH BEND SENS.            BnH,64H,00H,65H,00H,06H,mmH
  | |    |               FINE TUNING                 BnH,64H,01H,65H,00H,06H,mmH,26H,llH
  | |    |               COARSE TUNING               BnH,64H,02H,65H,00H,06H,mmH
  | |    |               RPN RESET                   BnH,64H,7FH,65H,7FH
  | |    |             ALL SOUND OFF                 BnH,78H,00H
  | |    |             RESET ALL CONTROLLERS         BnH,79H,00H
  | |    |             ALL NOTE OFF                  BnH,7BH
  | |    |             OMNI MODE OFF                 BnH,7CH
  | |    |             OMNI MODE ON                  BnH,7DH
  | |    |             MONO MODE                     BnH,7EH
  | |    |             POLY MODE                     BnH,7FH
  | |    |
  | |    +--- PROGRAM CHANGE                         CnH
  | |    |
  | |    +---        PITCH BEND CHANGE               EnH
  | |
  | |------+         SYSTEM EXCLUSIV MESSAGE
  | |    |             <PARAMETER CHANGE>
  | |    |------- MIDI MASTER TUNING                 F0H 43H 1nH 27H 30H 00H 00H mmH llH ccH F7H
  | |    |------- XG SYSTEM ON                       F0H 43H 1nH 4CH 00H 00H 7EH 00H F7H
  | |    |------- XG SYSTEM                          F0H 43H 1nH 4CH aaH aaH aaH ddH.....ddH F7H
  | |    |------- MULTI EFFECT                       F0H 43H 1nH 4CH aaH aaH aaH ddH.....ddH F7H
  | |    |------- MULTI PART                         F0H 43H 1nH 4CH aaH aaH aaH ddH.....ddH F7H
  | |
  | |------+         SYSTEM EXCLUSIV MESSAGE
  |            GM MODE ON                            F0H 7EH 7FH 09H 01H F7H
  |            MIDI MASTER VOLUME                    F0H 7FH 7FH 04H 01H llH mmH F7H
  |            IDENTITY REQUEST                      F0H 7EH 0nH 06H 01H F7H
  |
  |-------+          ACTIVE SENSING                  FEH
```

SW1 [] Data received from MIDI will be sounded by part "n" ("n" being the receive channel).

## (3) TRANSMIT/RECEIVE DATA

(3-1) CHANNEL VOICE MESSAGES

(3-1-1) NOTE OFF

```
STATUS              1000nnnn(8nH)     n = 0 ~ 15 VOICE CHANNEL NUMBER
NOTE NUMBER         0kkkkkkk          k = 0 (C-2) ~ 127 (G8)
VELOCITY            0vvvvvvv          v is ignored
```

Received only.

(3-1-2) NOTE ON/OFF

```
STATUS              1001nnnn(9nH)     n = 0 ~ 15 VOICE CHANNEL NUMBER
NOTE NUMBER         0kkkkkkk          k = 0 (C-2) ~ 127 (G8)
VELOCITY            0vvvvvvv          (v-0)        NOTE ON
                    00000000          (v=0)        NOTE OFF
```

(3-1-3) PROGRAM CHANGE

```
STATUS              1100nnnn(CnH)     n = 0 ~ 15 VOICE CHANNEL NUMBER
PROGRAM NUMBER      0ppppppp          p = 0 ~ 127
```

(3-1-4) PITCH BEND CHANGE

```
STATUS              1110nnnn(EnH)     n = 0 ~ 15 VOICE CHANNEL NUMBER
LSB                 0vvvvvvv          PITCH BEND CHANGE LSB
MSB                 0vvvvvvv          PITCH BEND CHANGE MSB
```

14 bit resolution

```
  MSB
  00000000B ( 00H )     minimum value
  01000000B ( 40H )     center value
  01111111B ( 7FH )     maximum Value
```

Transmitted according to the Assignable Knobs 1 - 8 settings.

(3-1-5) CONTROL CHANGE

```
STATUS  1011nnnn(BnH)     n = 0 ~ 15 VOICE CHANNEL NUMBER
CONTROL                   NUMBER      0ccccccc
CONTROL                   VALUE       0vvvvvvv
```

* The CONTROL NUMBER to be transmitted.

```
c =  0    BANK SEL MSB        ; v = 0:GM VOICE
                                 63:RM1x VOICE,
                                 126:RM1x DRUM KIT,
                                 127:GM DRUM
c = 32    BANK SEL LSB        ; v = 0 - 127                *3
c =  1    MODULATION          ; v = 0 - 127
c =  7    MAIN VOLUME         ; v = 0 - 127
c = 11    EXPRESSION          ; v = 0 - 127
c = 16    AC1 CONTROLLER      ; v = 0 - 127                *2
c = 64    SUSTAIN SWITCH      ; v = 0-63:OFF , 64-127:ON
```

c = 1 - 119 (except 32) are transmitted according to the Assignable Knobs 1 - 8 settings.
c = 64 is transmitted according to the Foot Switch setting.

* The CONTROL NUMBER to be received.

```
c =  0    BANK SEL MSB        ; v = 0:GM VOICE,
                                 63:RM1x VOICE,
                                 126:RM1x DRUM KIT,
                                 127:GM DRUM
c = 32    BANK SEL LSB        ; v = 0 - 127
c =  1    MODULATION          ; v = 0 - 127
c =  5    PORTAMENTO TIME     ; v = 0 - 127      *2
c =  6    DATA ENTRY MSB      ; v = 0 - 127      *1
c = 38    DATA ENTRY LSB      ; v = 0 - 127      *1
c =  7    MAIN VOLUME         ; v = 0 - 127
c = 10    PANPOT              ; v = 0 - 127
c = 11    EXPRESSION          ; v = 0 - 127
c = 16    AC1 CONTROLLER      ; v = 0 - 127      *2
c = 64    SUSTAIN SWITCH      ; v = 0-63:OFF , 64-127:ON
c = 65    PORTAMENTO SWITCH   ; v = 0-63:OFF , 64-127:ON *2
c = 66    SOSTENUTO           ; v = 0-63:OFF , 64-127:ON
c = 67    SOFT PEDAL          ; v = 0-63:OFF , 64-127:ON
c = 71    HARMONIC CONTENT    ; v = 0:-64  -  64:0  -  127:+63
c = 72    RELEASE TIME        ; v = 0:-64  -  64:0  -  127:+63
c = 73    ATTACK TIME         ; v = 0:-64  -  64:0  -  127:+63
c = 74    BRIGHTNESS          ; v = 0:-64  -  64:0  -  127:+63
c = 75    SOUND CONTROLLER 6  ; v = 0:-64  -  64:0  -  127:+63
c = 76    SOUND CONTROLLER 7  ; v = 0:-64  -  64:0  -  127:+63
c = 84    PORTAMENT CONTROL   ; v = 0 - 127 *2
c = 91    EFFECT SEND LEVEL 1 ; v = 0 - 127
c = 93    EFFECT SEND LEVEL 3 ; v = 0 - 127
c = 94    EFFECT SEND LEVEL 4 ; v = 0 - 127      (Only when Variation Connection = System)
c = 96    DATA ENTRY INC      ; v = 127          *1
c = 97    DATA ENTRY DEC      ; v = 127          *1
```

*1 Used only to set the parameter specified by RPN
*2 Not valid for rhythm voices.
*3 When MSB is 0,126 or 127, this is 0.
When MSB is 63, this is 0-6.

MODULATION controls the depth of vibrato.

PORTAMENTO TIME adjusts the speed of the pitch change if the Portamento Switch = ON. A setting of 0 produces the shortest portamento time, and 127 produces the longest portamento time. This value is valid only for the Portamento Switch (Ctr#65).

PANPOT produces change relative to the preset value of the voice, both for melody voices and for rhythm voices.

For PORTAMENTO CONTROL, the portamento time is always fixed at 0.

EFFECT SEND LEVEL 1 controls the Reverb send.
EFFECT SEND LEVEL 3 controls the Chorus send.
EFFECT SEND LEVEL 4 controls the Variation send.

HARMONIC CONTENT adjusts the resonance specified by the Voice. This is a relative parameter, and specifies an increase or decrease centered at 64. Higher values will produce a more distinctive tone. For some voices, the effective range maybe less than the range of the setting.

RELEASE TIME adjusts the envelope release time specified by the Voice. This is a relative parameter, and specifies an increase or decrease centered at 64.

ATTACK TIME adjusts the envelope attack time specified by the Voice. This is a relative parameter, and specifies an increase or decrease centered at 64.

SOUND CONTROLLER 6 adjusts the envelope decay time specified by the Voice. This is a relative parameter, and specifies an increase or decrease centered at 64.

BRIGHTNESS adjusts the cutoff frequency specified by the Voice. This is a relative parameter, and specifies an increase or decrease centered at 64. Decreasing the value will make the sound more mellow. For some voices, the effective range may be less than the range of the setting.

SOUND CONTROLLER 7 adjusts the LFO Frequency specified by the Voice. This is a relative parameter, and specifies an increase or decrease centered at 64.

(3-2) CHANNEL MODE MESSAGES

| | | |
|---|---|---|
| STATUS | 1011nnnn(BnH) | n = 0 ~ 15 VOICE CHANNEL NUMBER |
| CONTROL NUMBER | 0ccccccc | c = CONTROL NUMBER |
| CONTROL VALUE | 0vvvvvvv | v = DATA VALUE |

(3-2-1) ALL SOUND OFF (CONTROL NUMBER = 78H , DATA VALUE = 0)
Turns off the sound of all currently sounding notes on the corresponding channel. The status of channel messages such as Note On and Hold On is also turned off.

(3-2-2) RESET ALL CONTROLLERS (CONTROL NUMBER = 79H , DATA VALUE = 0)
Resets the values of the following controllers.

| | |
|---|---|
| PITCH BEND CHANGE | 0 (center) |
| MODULATION | 0 (off) |
| AC1 CONTROLLER | 0 (minimum) |
| EXPRESSION | 127 (maximum) |
| SUSTAIN SWITCH | 0 (off) |
| PORTAMENTO SWITCH | 0 (off) |
| SOSTENUTO SWITCH | 0 (off) |
| SOFT PEDAL | 0 (off) |
| NRPN | Un-set status. Internal data will not change. |
| RPN | Un-set status. Internal data will not change. |
| PORTAMENT CONTROL | reset |

The following data will not change.
PROGRAM CHANGE, BANK SELECT MSB/LSB, VOLUME, PAN, HARMONIC CONTENT, RELEASE TIME, ATTACK TIME, BRIGHTNESS, SOUND CONTROLLER 6,SOUND CONTROLLER 7, DRY SEND LEVEL,EFFECT SEND LEVEL 1, EFFECT SEND LEVEL 3,EFFECT SEND LEVEL 4,PITCH BEND SENSITIBITY, FINE TUNING, COURSE TUNING

(3-2-3) ALL NOTE OFF (CONTROL NUMBER = 7BH , DATA VALUE = 0)
Turns off all notes of the corresponding channel which are on. However if Sustain or Sostenuto are on, the sound will continue until these are turned off.

(3-2-4) OMNI MODE OFF (CONTROL NUMBER = 7CH , DATA VALUE = 0)
Performs the same processing as when ALL NOTE OFF is received. Sets the VOICE RECEIVE CHANNEL to OMNI OFF and CHANNEL = 1.

(3-2-5) OMNI MODE ON (CONTROL NUMBER = 7DH , DATA VALUE = 0)
Performs the same processing as when ALL NOTE OFF is received. Does not set OMNI ON. Sets the VOICE RECEIVE CHANNEL to OMNI ON.

(3-2-6) MONO (CONTROL NUMBER = 7EH , DATA VALUE = 0)
Performs the same processing as when All SOUND OFF is received, and if the 3rd byte (mono number) is in the range 0 - 16, sets the corresponding channel to Mode 4 (m=1). If in the VOICE MODE, Mode 2 (m=1) is also possible, according to the VOICE RECEIVE CHANNEL.

(3-2-7) POLY (CONTROL NUMBER = 7FH , DATA VALUE = 0)
Performs the same processing as when ALL SOUND OFF is received, and sets the corresponding channel to Mode 3. When in the VOICE MODE, Mode 1 is also possible, according to the VOICE RECEIVE CHANNEL.

(3-3) REGISTERED PARAMETER NUMBER

| | | |
|---|---|---|
| STATUS | 1011nnnn(BnH) | n = 0 - 15 VOICE CHANNEL NUMBER |
| LSB | 01100100(64H) | |
| RPN LSB | 0ppppppp | p = RPN LSB (Refer to the table on the following page.) |
| MSB | 01100101(65H) | |
| RPN MSB | 0qqqqqqq | q = RPN MSB (Refer to the table on the following page.) |
| DATA ENTRY MSB | 00000110(06H) | |
| DATA VALUE | 0mmmmmmm | m = Data Value |
| DATA ENTRY LSB | 00100110(26H) | |
| DATA VALUE | 0lllllll | l = Data Value |

First transmit an RPN MSB and RPN LSB to specify the parameter that is to be controlled, then use Data Entry to set the value of the specified parameter.

| RPN<br>LSB MSB | D.ENTRY<br>MSB LSB | PARAMETER NAME | DATA RANGE |
|---|---|---|---|
| 00H 00H | mmH --- | PITCH BEND SENSITIVITY | 00H - 18H (0 - 24 semitones) |
| 01H 00H | mmH llH | MASTER FINE TUNE | {mmH,llH} = {00H,00H} - {40H,00H} - {7FH,7FH}<br>(-8192*100/8192) - 0 - (+8192*100/8192) |
| 02H 00H | mmH --- | MASTER COARSE TUNE | 28H - 40H - 58H (-24 - 0 - +24 semitones) |
| 7FH 7FH | --- --- | RPN RESET | Set to a condition in which the RPN number is unspecified.<br>Internal settings will not change. |

(3-4) NON-REGISTERED PARAMETER NUMBER

| | | |
|---|---|---|
| STATUS | 1011nnnn(BnH) | n = 0 - 15 VOICE CHANNEL NUMBER |
| LSB | 01100010(62H) | |
| RPN LSB | 0ppppppp | p = NRPN LSB (Refer to the table on the following page.) |
| MSB | 01100011(63H) | |
| RPN MSB | 0qqqqqqq | q = NRPN MSB (Refer to the table on the following page.) |
| DATA ENTRY MSB | 00000110(06H) | |
| DATA VALUE | 0mmmmmmm | m = Data Value |

First transmit an NRPN MSB and NRPN LSB to specify the parameter that is to be controlled, then use Data Entry to set the value of the specified parameter.

| NRPN<br>MSB LSB | D.ENTRY<br>MSB LSB | PARAMETER NAME | DATA RANGE |
|---|---|---|---|
| 01H 08H | mmH --- | VIBRATO RATE | 00H - 40H - 7FH (-64 - 0 - +63) |
| 01H 09H | mmH --- | VIBRATO DEPTH | 00H - 40H - 7FH (-64 - 0 - +63) |
| 01H 0AH | mmH --- | VIBRATO DELAY | 00H - 40H - 7FH (-64 - 0 - +63) |
| 01H 20H | mmH --- | FILTER CUTOFF FREQUENCY | 00H - 40H - 7FH (-64 - 0 - +63) |
| 01H 21H | mmH --- | FILTER RESONANCE | 00H - 40H - 7FH (-64 - 0 - +63) |
| 01H 63H | mmH --- | EG ATTACK TIME | 00H - 40H - 7FH (-64 - 0 - +63) |
| 01H 64H | mmH --- | EG DECAY TIME | 00H - 40H - 7FH (-64 - 0 - +63) |
| 01H 66H | mmH --- | EG RELEASE TIME | 00H - 40H - 7FH (-64 - 0 - +63) |

(3-5) SYSTEM REAL TIME MESSAGES
(3-5-1) ACTIVE SENSING

STATUS 11111110 (FEH)

Transmitted at intervals of approximately 200 msec.
Not transmitted during disk read/write operations.

Once this message is received, SENSING will begin. If neither STATUS nor DATA messages are received for an interval longer than approximately 350 msec, the MIDI RECEIVE BUFFER will be cleared, and all sounding notes and SUSTAIN SWITCH will be forced off. Also, data for each of the controls will be reset to specific values.

(3-6) SYSTEM EXCLUSIVE MESSAGE
(3-6-1)UNIVERSAL NON REALTIME MESSAGE
(3-6-1-1)GENERAL MIDI MODE ON

F0H 7EH 7FH 09H 01H F7H

The following controller values will be reset.

| | |
|---|---|
| VOLUME | 100 |
| PAN | Center |
| PROGRAM CHANGE | 1 (Grandpno) |
| BANK SELECT MSB | 0 |
| REVERB DEPTH | 4 |
| PITCH BEND CHANGE | 0 (center) |
| MODULATION | 0 (off) |
| EXPRESSION | 127 (maximum) |
| SUSTAIN SWITCH | 0 (off) |
| SOSTENUTO SWITCH | 0 (off) |
| RPN | Un-set status. |
| PORTAMENT CONTROL | reset |
| MIDI MASTER VOLUME | 127 (maximum) |
| PITCH BEND SENSITIBITY | 02 (2 semitones) |
| FINE TUNING | 0 |
| COURSE TUNING | 0 |

(3-6-1-2)IDENTITY REQUEST (Received only)

F0H 7EH 0nH 06H 01H F7H ("n" is the device number, but the RM1x receives this in Omni.)

(3-6-1-3)IDENTITY REPLY (Transmitted only)

F0H 7EH 7FH 06H 02H 43H 00H 41H ddH ddH 00H 00H 00H 01H F7H
dd;Device Number Code RM1x = 1DH,03H

(3-6-2)UNIVERSAL REALTIME MESSAGE
(3-6-2-1) MIDI MASTER VOLUME

F0H 7FH 7FH 04H 01H llH mmH F7H

Modifies the MASTER VOLUME value.
The value of mm is used as the MIDI Master Volume (the ll value is ignored).

(3-6-3)PARAMETER CHANGE
(3-6-3-1) MIDI MASTER TUNING

F0H 43H 1nH 27H 30H 00H 00H mmH llH ccH F7H

Modifies the MASTER TUNE value.
The values of mm and ll are used as the MIDI Master Tuning.(n and cc values are ignored.)
T = M*200/256-100
Where T : actual tuning value (-99 - +99)
M: a one-byte value with MSB of "mm" bits 0-3, and LSB of "ll" bits 0-3.

(3-6-3-2) XG SYSTEM ON

| | | |
|---|---|---|
| 11110000 | F0 | Exclusive status |
| 01000011 | 43 | YAMAHA ID |
| 0001nnnn | 1n | device Number |
| 01001100 | 4C | Model ID |
| 0aaaaaaa | 00 | Address High |
| 0aaaaaaa | 00 | Address Mid |
| 0aaaaaaa | 7E | Address Low |
| 00000000 | 00 | Data |
| 11110111 | F7 | End of Exclusive |

When ON is received, controllers will be reset and all Multi Part and Effect data of the attached table will be reset to the XG default values.

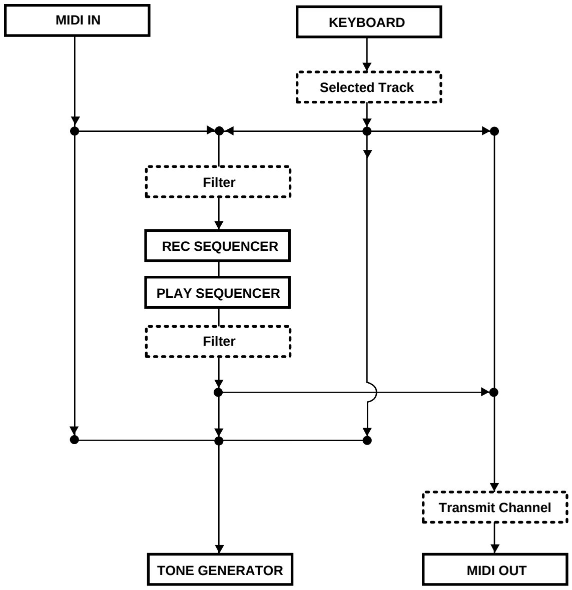
(3-6-3-3) XG PARMETER CHANGE

| | | |
|---|---|---|
| 11110000 | F0 | Exclusive status |
| 01000011 | 43 | YAMAHA ID |
| 0001nnnn | 1n | device Number |
| 01001100 | 4C | Model ID |
| 0aaaaaaa | aaaaaaa | Address High |
| 0aaaaaaa | aaaaaaa | Address Mid |
| 0aaaaaaa | aaaaaaa | Address Low |
| 0ddddddd | ddddddd | Data |
| \| | | \| |
| 11110111 | F7 | End of Exclusive |

For parameters with a Data Size of 2 or 4, the corresponding amount of data will be transmitted.
For Addresses and Byte Counts, refer to the attached tables.

The following 3 types are received.
System Data
Multi Effect Data
Multi Part Data

(4) Diagram of connections between the Controller block, Sequencer block, and Tone Generator block




## Sequncer block (Sequencer part)

### (1) TRANSMIT FLOW

```
     SW1 SW3
MIDI <-[]--[]--     CHANNEL VOICE MESSAGE
 OUT  |                       NOTE ON/OFF                    9nH
      |                       KEY'S AFTER TOUCH              AnH
      |                       CONTROL CHANGE                 BnH
      |                       PROGRAM CHANGE                 CnH
      |                       CHANNEL AFTER TOUCH            DnH
      |                       PITCH BEND CHANGE              EnH
      |    SW3
      |----[]--     CHANNEL MODE MESSAGE
      |                       ALL SOUND OFF                  BnH 78H
      |                       RESET ALL CONTROLLERS          BnH 79H
      |                       LOCAL CONTROL                  BnH 7AH
      |                       OMNI MODE OFF                  BnH 7CH
      |                       OMNI MODE ON                   BnH 7DH
      |                       MONO MODE ON                   BnH 7EH
      |                       POLY MODE ON                   BnH 7FH
      |SW2
      |-[]-+--- SYSTEM REALTIME MESSAGE
      |         |       TIMING CLOCK                         F8H
      |         |       START                                FAH
      |         |       CONTINUE                             FBH
      |         |       STOP                                 FCH
      |         |
      |         +---SYSTEM COMMON MESSAGE
      |                   SONG POSITION POINTER              F2H
      |                     SONG SELECT                      F3H
      |             SW3
      |----[]-- SYSTEM EXCLUSIV MESSAGE F0H ........ F7H
      |SW2 SW4
      |-[]-[]-- MIDI MACHINE CONTROL
                              STOP                           F0H 7FH 7FH 06H 01H F7H
                              DEFERRED PLAY                  F0H 7FH 7FH 06H 03H F7H
                              LOCATE                         F0H 7FH 7FH 06H 44H 06H 01H hrH mnH scH
                                                             frH ffH F7H
```

SW1 [] MIDI Transmit Channel
For each track, transmission can be turned on/off, and the transmit channel can be set.

SW2 [] MIDI Control Out
Transmission can be turned on/off.

SW3 [] MIDI Filter
Transmission can be turned on/off.

SW4 [] MIDI Sync
Transmitted when MIDI Sync = MTC.

### (2) RECEIVE FLOW

```
     SW1
MIDI >-[]---+     <CHANNEL VOICE MESSAGE>
  IN  |             |-----  NOTE OFF                     8nH
      |             |-----  NOTE ON/OFF                  9nH
      |             |-----  KEY'S AFTER TOUCH            AnH
      |             |-----  CONTROL CHANGE               BnH
      |             |-----  PROGRAM CHANGE               CnH
      |             |-----  CHANNEL AFTER TOUCH          DnH
      |             |-----  PITCH BEND CHANGE            EnH
      |             |
      |             |----- CHANNEL MODE MESSAGE
      |             |         ALL SOUND OFF              BnH 78H
      |             |         RESET ALL CONTROLLERS      BnH 79H
      |             |         LOCAL CONTROL              BnH 7AH
      |             |         OMNI MODE OFF              BnH 7CH
      |             |         OMNI MODE ON               BnH 7DH
      |             |         MONO MODE ON               BnH 7EH
      |             |         POLY MODE ON               BnH 7FH
      |             |
      |             |----- SYSTEM EXCLUSIV MESSAGE F0H ........ F7H
      |
      | SW3
      |-[]-------- TIMING CLOCK                          F8H
      |
      | SW3
      |-[]------ MTC QUATER FRAME MESSAGE                F1H
      | SW2
      |-[]------ SYSTEM REALTIME MESSAGE
      |           |          START                       FAH
      |           |          CONTINUE                    FBH
      |           |          STOP FCH                    FCH
      |           |
      |           +---- SYSTEM COMMON MESSAGE
      |                      SONG POSITION POINTER       F2H
      |                      SONG SELECT                 F3H
      |
      +--------- SYSTEM EXCLUSIV MESSAGE
                          SECTION CONTROL            F0H 43H 7EH 00H ssH ddH F7H
                          TEST ENTRY                 F0H 43H 10H 18H 5AH 00H F7H
                          LCD HARD COPY              F0H 43H 10H 18H 5AH 01H F7H
```

SW1 [] Input Filter
Reception can be turned on/off according to the MIDI Filter settings.

SW2 [] MIDI Control In
Reception can be turned On/Off.

SW3 [] MIDI Sync
Select whether timing will be determined by the Internal clock, or by MIDI Clock messages received at MIDI IN.

### (3) TRANSMIT/RECEIVE DATA

(3-1) CHANNEL VOICE MESSAGE

Transmitted only during recording and playback.
Transmission channel can be turned On/Off and the transmit channel set for each track.

Received only during recording. All Channel are always received.
During MULTI TRACK RECORD, data of MIDI CH 0-15 will be recorded separately onto tracks 1-16.

* In the RECORDING MODE, recording is normally omni on.
However, during MULTI TRACK RECORDING, this will be omni off, and data of MIDI CH 0-15 will be recorded separately onto tracks 1-16.

(3-1-1) NOTE OFF

| | | |
|---|---|---|
| STATUS | 1000nnnn(8nH) | n = 0 ~ 15 TRACK CHANNEL NUMBER |
| NOTE NUMBER | 0kkkkkkk | k = 0 (C-2) ~ 127 (G8) |
| VELOCITY | 0vvvvvvv | v is ignored |

Only recorded.
During playback, converted into 9nH kkH 00H.

(3-1-2) NOTE ON/OFF

| | | | |
|---|---|---|---|
| STATUS | 1001nnnn(9nH) | n = 0 ~ 15 TRACK CHANNEL NUMBER | |
| NOTE NUMBER | 0kkkkkkk | k = 0 (C-2) ~ 127 (G8) | |
| VELOCITY | 0vvvvvvv | (v-0) | NOTE ON |
| | 00000000 | (v=0) | NOTE OFF |

(3-1-3) POLYPHONIC KEY PRESSURE

| | | |
|---|---|---|
| STATUS | 1010nnnn(AnH) | n = 0 ~ 15 TRACK CHANNEL NUMBER |
| NOTE NUMBER | 0kkkkkkk | k = 0 (C-2) ~ 127 (G8) |
| VALUE | 0vvvvvvv | v = 0 - 127 |

(3-1-4) CONTROL CHANGE

| | | |
|---|---|---|
| STATUS | 1011nnnn(BnH) | n = 0 ~ 15 TRACK CHANNEL NUMBER |
| CONTROL NUMBER | 0ccccccc | |
| CONTROL VALUE | 0vvvvvvv | |

All Control Change messages are recorded and played back.

(3-1-5) PROGRAM CHANGE

| | | |
|---|---|---|
| STATUS | 1100nnnn(CnH) | n = 0 ~ 15 TRACK CHANNEL NUMBER |
| PROGRAM NUMBER | 0ppppppp | p = 0 - 127 |

(3-1-6) CHANNEL PRESSURE

| | | |
|---|---|---|
| STATUS | 1101nnnn(DnH) | n = 0 ~ 15 TRACK CHANNEL NUMBER |
| VALUE | 0vvvvvvv | v = 0 - 127 |

(3-1-7) PITCH BEND CHANGE

| | | |
|---|---|---|
| STATUS | 1110nnnn(EnH) | n = 0 ~ 15 TRACK CHANNEL NUMBER |
| LSB | 0vvvvvvv | PITCH BEND LSB 0 - 127 |
| MSB | 0vvvvvvv | PITCH BEND MSB 0 - 127 |

(3-2) CHANNEL MODE MESSAGE
The following messages are recorded and played back.

| | |
|---|---|
| RESET ALL CONTROLLERS | BnH 78H |
| LOCAL CONTROL | BnH 7AH |
| OMNI MODE OFF | BnH 7CH |
| OMNI MODE ON | BnH 7DH |
| MONO MODE ON | BnH 7EH |
| POLY MODE ON | BnH 7FH |

(3-3) SYSTEM COMMON MESSAGE
These are transmitted and received as Control Messages for RM1x functions.
They are not recorded as SEQUENCE DATA.

(3-3-1) SONG POSITION POINTER

| | | |
|---|---|---|
| STATUS | 11110010(F2H) | |
| LSB | 0vvvvvvv | SONG POSITION LSB |
| MSB | 0vvvvvvv | SONG POSITION MSB |

Transmitted when you move to a different measure in the SONG PLAY Mode.
Received when not playing in the SONG PLAY mode.

(3-3-2) SONG SELECT

| | | |
|---|---|---|
| STATUS | 11110011(F3H) | |
| SONG NUMBER | 0sssssss | SONG NUMBER(PATTERN MODE??PATTERN NUMBER) |

In the SONG mode, this will be transmitted when a song number is changed.
In the PATTERN mode, this will be transmitted when a style number is changed.
When in the SONG mode not playing, the PATTERN mode, this message is received.
When received in the PATTERN mode, a STYLE number will change.

(3-4) SYSTEM REAL TIME MESSAGE
Not recorded as Sequence Data.

(3-4-1) TIMING CLOCK

STATUS 11111000(F8H)

You can select whether the internal clock will be used as the Timing Clock, or whether Timing Clock messages from the MIDI IN will be used.
Transmission/reception can be turned On/Off.

(3-4-2) START

STATUS 11111010(FAH)

Transmission/Reception can be turned On/Off.

(3-4-3) CONTINUE

STATUS 11111011(FBH)

Transmission/Reception can be turned On/Off.

(3-4-4) STOP

STATUS 11111100(FCH)

Transmission/Reception can be turned On/Off.

(3-5) SYSTEM EXCLUSIVE MESSAGE

All System Exclusive Messages are recorded and played back.
Even if time intervals existed within the actual data that was received, the entire message between F0 and F7 will be recorded into one timing location.
For playback, an interval time can be specified for each 1K bytes.

(3-6) SECTION CONTROL

| | | |
|---|---|---|
| 11110000 | F0 | Exclusive status |
| 01000011 | 43 | YAMAHA ID |
| 01111110 | 7E | Style |
| 00000000 | 00 | Section Control |
| 0sssssss | ss | Section |
| 0ddddddd | dd | On/Off |
| 11110111 | F7 | End of Exclusive |

ss=08H-0FH, dd=on is received, and the PATTERN will be changed to the RM1x's sections A - P respectively.

(3-7) MIDI TIME CODE(QUARTER FRAME MESSAGE)

STATUS 11110001(F1H)
0nnnxxxx

If MTC is selected as the Timing Clock, MTC Quarter Frame messages will be received.

(3-8) MIDI MACHINE CONTROL

These will be transmitted if MTC is selected as the Timing Clock.

(3-8-1) STOP(MCS)

| | | |
|---|---|---|
| 11110000 | F0 | Exclusive status |
| 01111111 | 7F | RealTime Header |
| 01111111 | 7F | device ID |
| 00000110 | 06 | MMC Command Message |
| 00000001 | 01 | STOP(MCS) |
| 11110111 | F7 | End of Exclusive |

Transmitted when the STOP button is pressed.

(3-8-2) DEFERRED PLAY(MCS)

| | | |
|---|---|---|
| 11110000 | F0 | Exclusive status |
| 01111111 | 7F | RealTime Header |
| 01111111 | 7F | device ID |
| 00000110 | 06 | MMC Command Message |
| 00000011 | 03 | DEFERRED PLAY(MCS) |
| 11110111 | F7 | End of Exclusive |

Transmitted when the PLAY button is pressed.

(3-8-3) LOCATE(MCP)

| | | |
|---|---|---|
| 11110000 | F0 | Exclusive status |
| 01111111 | 7F | RealTime Header |
| 01111111 | 7F | device ID |
| 00000110 | 06 | MMC Command Message |
| 01000100 | 44 | LOCATE(MCP) |
| 00000110 | 06 | Byte Count |
| 00000001 | 01 | "TERGET" Sub Command |
| 0tthhhhh | hr | standard time specification with sub-frames |
| 0cmmmmmm | mn | |
| 0kssssss | sc | |
| 0giffff | fr | |
| 0bbbbbbb | ff | |
| 11110111 | F7 | End of Exclusive |

Transmitted when you move between measures in the SONG mode.

## <Table 1-1> Parmeter Base Address

| | Parameter Change Address (H) | (M) | (L) | Description |
|---|---|---|---|---|
| SYSTEM | 00 | 00 | 00 | System |
| | 00 | 00 | 7E | XG System On |
| | 00 | 00 | 7F | All Parameter Reset |
| INFORMATION | 01 | 00 | 00 | System Information |
| EFFECT 1 | 02 | 01 | 00 | Effect1(Reverb,Chorus,Variation ) |
| | 02 | 40 | 00 | Reserved |
| | : | : | : | : |
| MULTI PART | 08 | 00 | 00 | Multi Part 1 |
| | | | | : |
| | 08 | 0F | 00 | Multi Part 16 |
| | 08 | 10 | 00 | Reserved |
| | : | : | : | : |

## <Table 1-2> MIDI Parameter Change table ( SYSTEM )

| Address (H) | Size (H) | Data (H) | Parameter Name | Description | Default value(H) |
|---|---|---|---|---|---|
| 00 00 00 | 4 | 0000 | Master Tune | -102.4..+102.3[cent] | 00 04 00 00 |
| 01 | | ..07FF | | 1st bit3-0→bit15-12 | (0400) |
| 02 | | | | 2nd bit3-0→bit11-8 | (not reset by XG or GM on) |
| 03 | | | | 3rd bit3-0→bit7-4 | (not reset by XG or GM on) |
| | | | | 4th bit3-0→bit3-0 | |
| 04 | 1 | 00..7F | Master Volume | 0..127 | 7F |
| 05 | 1 | Not Used | | | |
| 06 | 1 | 28..58 | Transpose | -24..+24[semitones] | 40 |
| 7D | | Not Used | | | |
| 7E | 00 | XG System On | 00=XG Sytem on (receive only) | | |
| 7F | 00 | All Parameter Reset | | 00=on (receive only) | |

TOTAL SIZE 06

## <Table 1-3> MIDI Parameter Change table ( EFFECT 1)

| Address (H) | Size (H) | Data (H) | Parameter Name | Description | Default value(H) |
|---|---|---|---|---|---|
| 02 01 00 | 2 | 00..7F | Reverb Type MSB | Refer to Ef. Parameter List | 01(=HALL1) |
| | | 00..7F | Reverb Type LSB | 00 : basic type | 00 |
| 02 | 1 | 00..7F | Reverb Parameter 1 | Refer to Ef. Parameter List | depends on Reverb type |
| 03 | 1 | 00..7F | Reverb Parameter 2 | Refer to Ef. Parameter List | depends on Reverb type |
| 04 | 1 | 00..7F | Reverb Parameter 3 | Refer to Ef. Parameter List | depends on Reverb type |
| 05 | 1 | 00..7F | Reverb Parameter 4 | Refer to Ef. Parameter List | depends on Reverb type |
| 06 | 1 | 00..7F | Reverb Parameter 5 | Refer to Ef. Parameter List | depends on Reverb type |
| 07 | 1 | 00..7F | Reverb Parameter 6 | Refer to Ef. Parameter List | depends on Reverb type |
| 08 | 1 | 00..7F | Reverb Parameter 7 | Refer to Ef. Parameter List | depends on Reverb type |
| 09 | 1 | 00..7F | Reverb Parameter 8 | Refer to Ef. Parameter List | depends on Reverb type |
| 0A | 1 | 00..7F | Reverb Parameter 9 | Refer to Ef. Parameter List | depends on Reverb type |
| 0B | 1 | 00..7F | Reverb Parameter 10 | Refer to Ef. Parameter List | depends on Reverb type |
| 0C | 1 | 00..7F | Reverb Return | -°..0..+6dB(0..96..127) | 40 |
| 0D | 1 | 01..7F | Reverb Pan | L63..C..R63(1..64..127) | 40 |

TOTAL SIZE 0E

| Address (H) | Size (H) | Data (H) | Parameter Name | Description | Default value(H) |
|---|---|---|---|---|---|
| 02 01 10 | 1 | 00..7F | Reverb Parameter 11 | Refer to Ef. Parameter List | depends on Reverb type |
| 11 | 1 | 00..7F | Reverb Parameter 12 | Refer to Ef. Parameter List | depends on Reverb type |
| 12 | 1 | 00..7F | Reverb Parameter 13 | Refer to Ef. Parameter List | depends on Reverb type |
| 13 | 1 | 00..7F | Reverb Parameter 14 | Refer to Ef. Parameter List | depends on Reverb type |
| 14 | 1 | 00..7F | Reverb Parameter 15 | Refer to Ef. Parameter List | depends on Reverb type |
| 15 | 1 | 00..7F | Reverb Parameter 16 | Refer to Ef. Parameter List | depends on Reverb type |
| TOTAL SIZE 6 | | | | | |
| 02 01 20 | 2 | 00..7F | Chorus Type MSB | Refer to Ef. Parameter List | 41(=Chorus1) |
| | | 00..7F | Chorus Type LSB | 00 : basic type | 00 |
| 22 | 1 | 00..7F | Chorus Parameter 1 | Refer to Ef. Parameter List | depends on Chorus Type |
| 23 | 1 | 00..7F | Chorus Parameter 2 | Refer to Ef. Parameter List | depends on Chorus Type |
| 24 | 1 | 00..7F | Chorus Parameter 3 | Refer to Ef. Parameter List | depends on Chorus Type |
| 25 | 1 | 00..7F | Chorus Parameter 4 | Refer to Ef. Parameter List | depends on Chorus Type |
| 26 | 1 | 00..7F | Chorus Parameter 5 | Refer to Ef. Parameter List | depends on Chorus Type |
| 27 | 1 | 00..7F | Chorus Parameter 6 | Refer to Ef. Parameter List | depends on Chorus Type |
| 28 | 1 | 00..7F | Chorus Parameter 7 | Refer to Ef. Parameter List | depends on Chorus Type |
| 29 | 1 | 00..7F | Chorus Parameter 8 | Refer to Ef. Parameter List | depends on Chorus Type |
| 2A | 1 | 00..7F | Chorus Parameter 9 | Refer to Ef. Parameter List | depends on Chorus Type |
| 2B | 1 | 00..7F | Chorus Parameter 10 | Refer to Ef. Parameter List | depends on Chorus Type |
| 2C | 1 | 00..7F | Chorus Return | -°..0..+6dB(0..96..127) | 40 |
| 2D | 1 | 01..7F | Chorus Pan | L63..C..R63(1..64..127) | 40 |
| 2E | 1 | 00..7F | Send Chorus To Reverb | -°..0..+6dB(0..96..127) | 00 |
| TOTAL SIZE 0F | | | | | |
| 02 01 30 | 1 | 00..7F | Chorus Parameter 11 | Refer to Ef. Parameter List | depends on Chorus Type |
| 31 | 1 | 00..7F | Chorus Parameter 12 | Refer to Ef. Parameter List | depends on Chorus Type |
| 32 | 1 | 00..7F | Chorus Parameter 13 | Refer to Ef. Parameter List | depends on Chorus Type |
| 33 | 1 | 00..7F | Chorus Parameter 14 | Refer to Ef. Parameter List | depends on Chorus Type |
| 34 | 1 | 00..7F | Chorus Parameter 15 | Refer to Ef. Parameter List | depends on Chorus Type |
| 35 | 1 | 00..7F | Chorus Parameter 16 | Refer to Ef. Parameter List | depends on Chorus Type |
| TOTAL SIZE 6 | | | | | |
| 02 01 40 | 2 | 00..7F | Variation Type MSB | Refer to Ef. Parameter List | "05(=DELAY L,C,R)" |
| | | 00..7F | Variation Type LSB | 00 : basic type | 00 |
| 42 | 2 | 00..7F | Variation Param 1 MSB | Refer to Ef. Parameter List | depends on vari. type |
| | | 00..7F | Variation Param 1 LSB | Refer to Ef. Parameter List | depends on vari. type |
| 44 | 2 | 00..7F | Variation Param 2 MSB | Refer to Ef. Parameter List | depends on vari. type |
| | | 00..7F | Variation Param 2 LSB | Refer to Ef. Parameter List | depends on vari. type |
| 46 | 2 | 00..7F | Variation Param 3 MSB | Refer to Ef. Parameter List | depends on vari. type |
| | | 00..7F | Variation Param 3 LSB | Refer to Ef. Parameter List | depends on vari. type |
| 48 | 2 | 00..7F | Variation Param 4 MSB | Refer to Ef. Parameter List | depends on vari. type |
| | | 00..7F | Variation Param 4 LSB | Refer to Ef. Parameter List | depends on vari. type |
| 4A | 2 | 00..7F | Variation Param 5 MSB | Refer to Ef. Parameter List | depends on vari. type |
| | | 00..7F | Variation Param 5 LSB | Refer to Ef. Parameter List | depends on vari. type |
| 4C | 2 | 00..7F | Variation Param 6 MSB | Refer to Ef. Parameter List | depends on vari. type |
| | | 00..7F | Variation Param 6 LSB | Refer to Ef. Parameter List | depends on vari. type |
| 4E | 2 | 00..7F | Variation Param 7 MSB | Refer to Ef. Parameter List | depends on vari. type |
| | | 00..7F | Variation Param 7 LSB | Refer to Ef. Parameter List | depends on vari. type |
| 50 | 2 | 00..7F | Variation Param 8 MSB | Refer to Ef. Parameter List | depends on vari. type |
| | | 00..7F | Variation Param 8 LSB | Refer to Ef. Parameter List | depends on vari. type |
| 52 | 2 | 00..7F | Variation Param 9 MSB | Refer to Ef. Parameter List | depends on vari. type |
| | | 00..7F | Variation Param 9 LSB | Refer to Ef. Parameter List | depends on vari. type |
| 54 | 2 | 00..7F | Variation Param 10 MSB | Refer to Ef. Parameter List | depends on vari. type |
| | | 00..7F | Variation Param 10 LSB | Refer to Ef. Parameter List | depends on vari. type |
| 56 | 1 | 00..7F | Variation Return | -°..0..+6dB(0..96..127) | 40 |
| 57 | 1 | 01..7F | Variation Pan | L63..C..R63(1..64..127) | 40 |
| 58 | 1 | 00..7F | Send Variation To Rev. | -°..0..+6dB(0..96..127) | 00 |
| 59 | 1 | 00..7F | Send Variation To Cho. | -°..0..+6dB(0..96..127) | 00 |
| 5A | 1 | 00..01 | Variation Connection | 0:insertion,1:system | 00 |
| 5B | 1 | 00..1F | Variation Part | part1..32(0..31),off(127) | 7F |
| 5C | 1 | 01..7F | MW Variation Ctrl Depth | -63..+63 | 00 |
| 5D | 1 | 01..7F | PB Variation Ctrl Depth | -63..+63 | 00 |
| 5E | 1 | 01..7F | AT Variation Ctrl Depth | -63..+63 | 00 |
| 5F | 1 | 01..7F | AC1 Variation CtrlDepth | -63..+63 | 00 |
| 60 | 1 | 01..7F | AC2 Variation CtrlDepth | -63..+63 | 00 |
| TOTAL SIZE 21 | | | | | |
| 02 01 70 | 1 | 00..7F | Variation Parameter 11 | option Parameter | depends on vari. type |
| 71 | 1 | 00..7F | Variation Parameter 12 | option Parameter | depends on vari. type |
| 72 | 1 | 00..7F | Variation Parameter 13 | option Parameter | depends on vari. type |
| 73 | 1 | 00..7F | Variation Parameter 14 | option Parameter | depends on vari. type |
| 74 | 1 | 00..7F | Variation Parameter 15 | option Parameter | depends on vari. type |
| 75 | 1 | 00..7F | Variation Parameter 16 | option Parameter | depends on vari. type |
| TOTAL SIZE 6 | | | | | |

<Table 1-4> MIDI Parameter table ( MULTI EQ )

| Address (H) | Size (H) | Data (H) | Parameter Name | Description | Default value(H) |
|---|---|---|---|---|---|
| 02 40 00 | 1 | | Not Used | | |
| 01 | 1 | 28..58 | Low Boost Gain | -24dB..+24dB | 40(0dB) |
| 02 | 1 | 04..28 | low Boost Frequency | 50Hz..2.0KHz | 0c(80Hz) |
| 03 | 1 | | Not Used | | |
| 04 | 1 | | Not Used | | |
| 05 | 1 | | Not Used | | |
| 06 | 1 | | Not Used | | |
| 07 | 1 | | Not Used | | |
| 08 | 1 | | Not Used | | |
| 09 | 1 | | Not Used | | |
| 0A | 1 | | Not Used | | |
| 0B | 1 | | Not Used | | |
| 0C | 1 | | Not Used | | |
| 0D | 1 | | Not Used | | |
| 0E | 1 | | Not Used | | |
| 0F | 1 | | Not Used | | |
| 10 | 1 | | Not Used | | |
| 11 | 1 | | Not Used | | |
| 12 | 1 | | Not Used | | |
| 13 | 1 | | Not Used | | |
| 14 | 1 | | Not Used | | |
| 15 | 1 | | Not Used | | |
| TOTAL SIZE 15 | | | | | |

<Table 1-5> MIDI Parameter Change table ( MULTI PART )

| Address (H) | Size (H) | Data (H) | Parameter Name | Description | Default value(H) |
|---|---|---|---|---|---|
| 08 nn 00 | 1 | | Not Used | | |
| nn 01 | 1 | 00..7F | Bank Select MSB | 0..127 | |
| nn 02 | 1 | 00..7F | Bank Select LSB | 0..127 | 00 (except part 10), 7F(part 10) |
| nn 03 | 1 | 00..7F | Program Number | 1..128 | 00 |

| | | | | | |
|---|---|---|---|---|---|
| nn 04 | | | Not Used | | |
| nn 05 | 1 | 00..01 | Mono/Poly Mode | 0:mono,1:poly | 01 |
| nn 06 | 1 | 00..02 | Same Note Number | 0:single | 01 |
| | | | Key On Assign | 1:multi | |
| | | | | 2:inst (for DRUM) | |
| nn 07 | | | Not Used | | |
| nn 08 | 1 | 28..58 | Note Shift | -24..+24[semitones] | 40 |
| nn 09 | 2 | 00..FF | Detune | -12.8..+12.7[Hz] | 08 00 |
| nn 0A | | | | 1st bit3..0→bit7..4 | (80) |
| | | | | 2nd bit3..0→bit3..0 | |
| nn 0B | 1 | 00..7F | Volume | 0..127 | 64 |
| nn 0C | 1 | 00..7F | Velocity Sense Depth | 0..127 | 40 |
| nn 0D | 1 | 00..7F | Velocity Sense Offset | 0..127 | 40 |
| nn 0E | 1 | 00..7F | Pan | 0:random | 40 |
| | | | | L63..C..R63(1..64..127) | |
| nn 0F | 1 | 00..7F | Note Limit Low | C-2..G8 | 00 |
| nn 10 | 1 | 00..7F | Note Limit High | C-2..G8 | 7F |
| nn 11 | 1 | 00..7F | Dry Level | 0..127 | 7F |
| nn 12 | 1 | 00..7F | Chorus Send | 0..127 | 00 |
| nn 13 | 1 | 00..7F | Reverb Send | 0..127 | 28 |
| nn 14 | 1 | 00..7F | Variation Send | 0..127 | 00 |
| nn 15 | 1 | 00..7F | Vibrato Rate | -64..+63 | 40 |
| nn 16 | 1 | 00..7F | Vibrato Depth | -64..+63 | 40 |
| nn 17 | 1 | 00..7F | Vibrato Delay | -64..+63 | 40 |
| nn 18 | 1 | 00..7F | Filter Cutoff Frequency | -64..+63 | 40 |
| nn 19 | 1 | 00..7F | Filter Resonance | -64..+63 | 40 |
| nn 1A | 1 | 00..7F | EG Attack Time | -64..+63 | 40 |
| nn 1B | 1 | 00..7F | EG Decay Time | -64..+63 | 40 |
| nn 1C | 1 | 00..7F | EG Release Time | -64..+63 | 40 |
| nn 1D | 1 | 28..58 | MW Pitch Control | -24..+24[semitones] | 40 |
| nn 1E | 1 | 00..7F | MW Filter Control | -9600..+9450[cent] | 40 |
| nn 1F | 1 | 00..7F | MW Amplitude Control | -64..+63 | 40 |
| nn 20 | 1 | 00..7F | MW LFO PMod Depth | 0..127 | 0A |
| nn 21 | 1 | 00..7F | MW LFO FMod Depth | 0..127 | 00 |
| nn 22 | 1 | 00..7F | MW LFO AMod Depth | 0..127 | 00 |
| nn 23 | 1 | 28..58 | Bend Pitch Control | -24..+24[semitones] | 42 |
| nn 24 | 1 | 00..7F | Bend Filter Control | -9600..+9450[cent] | 40 |
| nn 25 | 1 | 00..7F | Bend Amplitude Control | -64..+63 | 40 |
| nn 26 | 1 | 00..7F | Bend LFO PMod Depth | 0..127 | 00 |
| nn 27 | 1 | 00..7F | Bend LFO FMod Depth | 0..127 | 00 |
| nn 28 | 1 | 00..7F | Bend LFO AMod Depth | 0..127 | 00 |

TOTAL SIZE 29

| | | | | | |
|---|---|---|---|---|---|
| nn 30 | 1 | | Not Used | | |
| nn 31 | 1 | | Not Used | | |
| nn 32 | 1 | | Not Used | | |
| nn 33 | 1 | | Not Used | | |
| nn 34 | 1 | | Not Used | | |
| nn 35 | 1 | | Not Used | | |
| nn 36 | 1 | | Not Used | | |
| nn 37 | 1 | | Not Used | | |
| nn 38 | 1 | | Not Used | | |
| nn 39 | 1 | | Not Used | | |
| nn 3A | 1 | | Not Used | | |
| nn 3B | 1 | | Not Used | | |
| nn 3C | 1 | | Not Used | | |
| nn 3D | 1 | | Not Used | | |
| nn 3E | 1 | | Not Used | | |
| nn 3F | 1 | | Not Used | | |
| nn 40 | 1 | | Not Used | | |
| nn 41 | 1 | | Not Used | | |
| nn 42 | 1 | | Not Used | | |
| nn 43 | 1 | | Not Used | | |
| nn 44 | 1 | | Not Used | | |
| nn 45 | 1 | | Not Used | | |
| nn 46 | 1 | | Not Used | | |
| nn 47 | 1 | | Not Used | | |
| nn 48 | 1 | | Not Used | | |
| nn 49 | 1 | | Not Used | | |
| nn 4A | 1 | | Not Used | | |
| nn 4B | 1 | | Not Used | | |
| nn 4C | 1 | | Not Used | | |
| nn 4D | 1 | | Not Used | | |
| nn 4E | 1 | | Not Used | | |
| nn 4F | 1 | | Not Used | | |
| nn 50 | 1 | 00..7F | CAT LFO PMod Depth | 0..127 | 00 |
| nn 51 | 1 | 00..7F | CAT LFO FMod Depth | 0..127 | 00 |
| nn 52 | 1 | 00..7F | CAT LFO AMod Depth | 0..127 | 00 |
| nn 53 | 1 | | Not Used | | |
| nn 54 | 1 | | Not Used | | |
| nn 55 | 1 | | Not Used | | |
| nn 56 | 1 | | Not Used | | |
| nn 57 | 1 | | Not Used | | |
| nn 58 | 1 | | Not Used | | |
| nn 59 | 1 | | Not Used | | |
| nn 5A | 1 | | Not Used | | |
| nn 5B | 1 | | Not Used | | |
| nn 5C | 1 | | Not Used | | |
| nn 5D | 1 | | Not Used | | |
| nn 5E | 1 | | Not Used | | |
| nn 5F | 1 | | Not Used | | |
| nn 60 | 1 | | Not Used | | |
| nn 61 | 1 | | Not Used | | |
| nn 62 | 1 | | Not Used | | |
| nn 63 | 1 | | Not Used | | |
| nn 64 | 1 | | Not Used | | |
| nn 65 | 1 | | Not Used | | |
| nn 66 | 1 | | Not Used | | |
| nn 67 | 1 | 00..01 | Portamento Switch | off/on | 00 |
| nn 68 | 1 | 00..7F | Portamento Time | 0..127 | 00 |
| nn 69 | 1 | 00..7F | Pitch EG Initial Level | -64..+63 | 40 |
| nn 6A | 1 | 00..7F | Pitch EG Attack Time | -64..+63 | 40 |
| nn 6B | 1 | 00..7F | Pitch EG Release Level | -64..+63 | 40 |
| nn 6C | 1 | 00..7F | Pitch EG Release Time | -64..+63 | 40 |

| | | |
|---|---|---|
| nn 6D | 1 | Not Used |
| nn 6E | 1 | Not Used |
| TOTAL SIZE 3F | | |

nn = PartNumber
For the Drum Part, the following parameters have no effect.

- ¥Bank Select LSB
- ¥Portamento
- ¥Soft Pedal
- ¥Mono/Poly
- ¥Scale Tuning
- ¥Pitch EG

## <Table 1-6> Effect Type List

### REVERB TYPE

| TYPE MSB | | TYPE LSB | | |
|---|---|---|---|---|
| DEC | HEX | 00 | 01 | 02 |
| 000 | 0 | No Effect | | |
| 001 | 1 | Rev Hall 1 | Rev Hall 2 | |
| 002 | 2 | Rev Room1 | Rev Room 2 | Rev Room 3 |
| 003 | 3 | Rev Stage 1 | Rev Stage 2 | |
| 004 | 4 | Rev Plate | | |
| 005 | 5 | No Effect | | |
| : | : | : | | |
| 015 | F | No Effect | | |
| 016 | 10 | Rev WhiteRm | | |
| 017 | 11 | Rev Tunnel | | |
| 018 | 12 | No Effect | | |
| 019 | 13 | Rev Basement | | |
| 020 | 14 | No Effect | | |
| : | : | : | | |
| 127 | 7F | No Effect | | |

### CHORUS TYPE

| TYPE MSB | | TYPE LSB | | | |
|---|---|---|---|---|---|
| DEC | HEX | 00 | 01 | 02 | 08 |
| 000 | 0 | No Effect | | | |
| 001 | 1 | No Effect | | | |
| : | : | : | | | |
| 064 | 40 | No Effect | | | |
| 065 | 41 | Chorus 1 | Chorus 2 | Chorus 3 | Chorus 4 |
| 066 | 42 | Celeste 1 | Celeste 2 | Celeste 3 | Celeste 4 |
| 067 | 43 | Flanger 1 | Flanger 2 | | Flanger 3 |
| 068 | 46 | No Effect | | | |
| 069 | 45 | No Effect | | | |
| : | : | : | | | |
| : | : | : | | | |
| 127 | 7F | No Effect | | | |

### VARIATION TYPE(0~63)

| TYPE MSB | | TYPE LSB | | |
|---|---|---|---|---|
| DEC | HEX | 00 | 01 | 02 |
| 000 | 0 | No Effect | | |
| 001 | 1 | Rev Hall 1 | Rev Hall 2 | |
| 002 | 2 | Rev Room 1 | Rev Room 2 | Rev Room 3 |
| 003 | 3 | Rev Stage1 | Rev Stage2 | |
| 004 | 4 | Rev Plate | | |
| 005 | 5 | DelayL,C,R | | |
| 006 | 6 | Delay L,R | | |
| 007 | 7 | Echo | | |
| 008 | 8 | CrossDelay | | |
| 009 | 9 | EarlyRef.1 | EarlyRef.2 | |
| 010 | A | GateReverb | | |
| 011 | B | ReversGate | | |
| 012 | C | No Effect(sys),THRU(ins) | | |
| : | : | : | | |
| 019 | 13 | No Effect(sys),THRU(ins) | | |
| 020 | 14 | [17]Karaoke1 | Karaoke2 | Karaoke3 |
| 021 | 15 | No Effect(sys),THRU(ins) | | |
| : | : | : | | |
| 063 | 3F | No Effect(sys),THRU(ins) | | |

### VARIATION TYPE(64~127)

| TYPE MSB | | TYPE LSB | | | |
|---|---|---|---|---|---|
| DEC | HEX | 00 | 01 | 02 | 08 |
| 064 | 40 | THRU | | | |
| 065 | 41 | Chorus 1 | Chorus 2 | Chorus 3 | Chorus 4 |
| 066 | 42 | Celeste 1 | Celeste 2 | Celeste 3 | Celeste 4 |
| 067 | 43 | Flanger 1 | Flanger 2 | | Flanger 3 |
| 068 | 44 | Symphonic | | | |
| 069 | 45 | RotarySp. | | | |
| 070 | 46 | Tremolo | | | |
| 071 | 47 | Auto PAN | | | |
| 072 | 48 | Phaser 1 | | | Phaser 2 |
| 073 | 49 | Distortion | | | |
| 074 | 4A | Overdrive | | | |
| 075 | 4B | G-Amp.Sim. | | | |
| 076 | 4C | 3 Band EQ | | | |
| 077 | 4D | 2 Band EQ | | | |
| 078 | 4E | Auto Wah | | | |
| 079 | 4F | THRU | | | |
| : | : | : | | | |
| 127 | 7F | THRU | | | |

# RM1x SEQUENCE REMIXER

# PARTS LIST

■**CONTENTS**



Note) DESTINATION ABBREVIATIONS

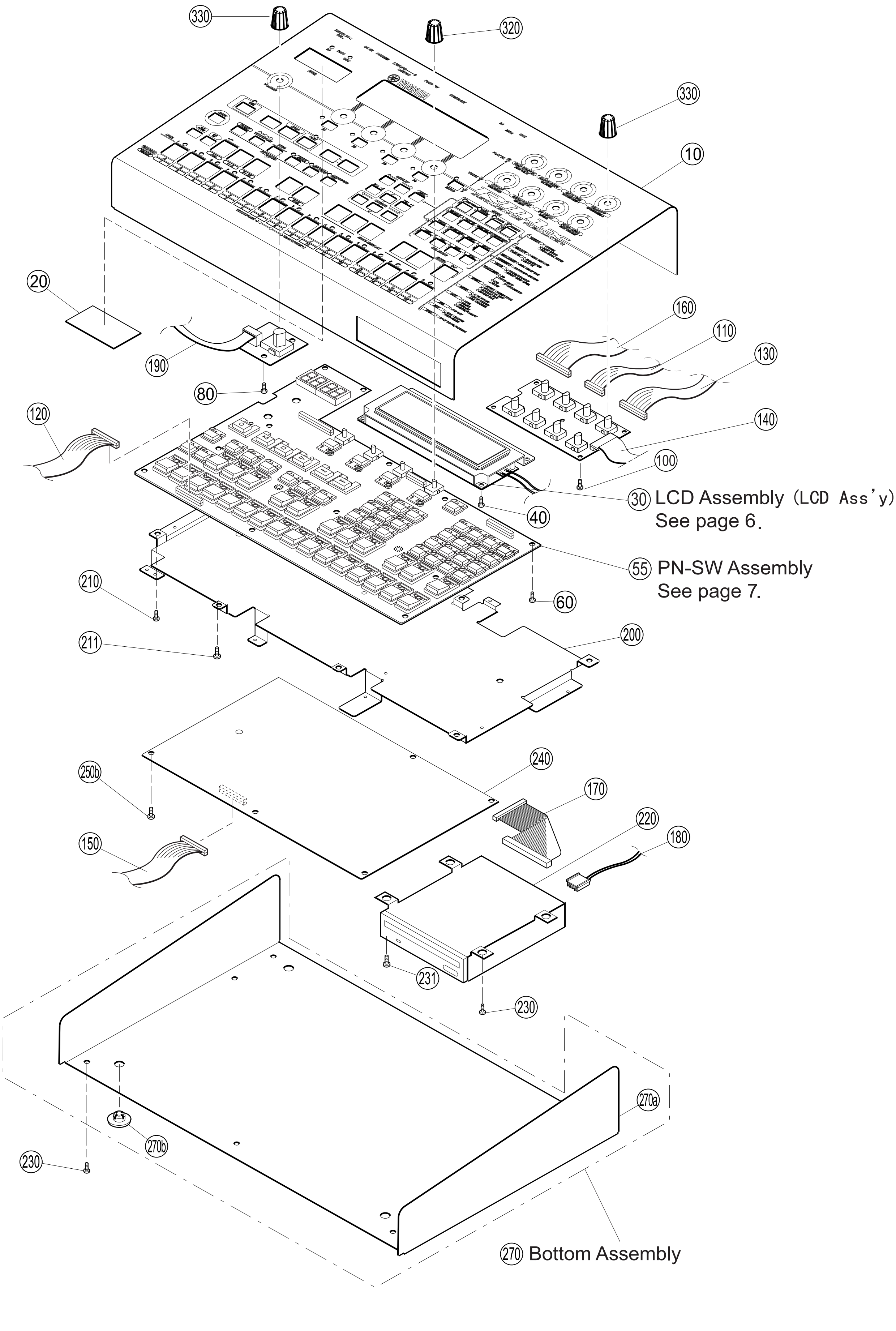
| | |
|---|---|
| J : Japanese model | A : Australian model |
| U : U.S. model | E : European model |
| C : Canadian model | D : German model |
| X : General model | B : British model |
| M : South African model | I : Indonesian model |
| H : North European model | |

■ WARNING

Components having special characteristics are marked ⚠ and must be replaced with parts having specifications equal to those originally installed.

- The numbers in “QTY” shows quantities for each unit.
- The parts with “– –” in “Part No.” are not available as spare parts.

# OVERALL ASSEMBLY

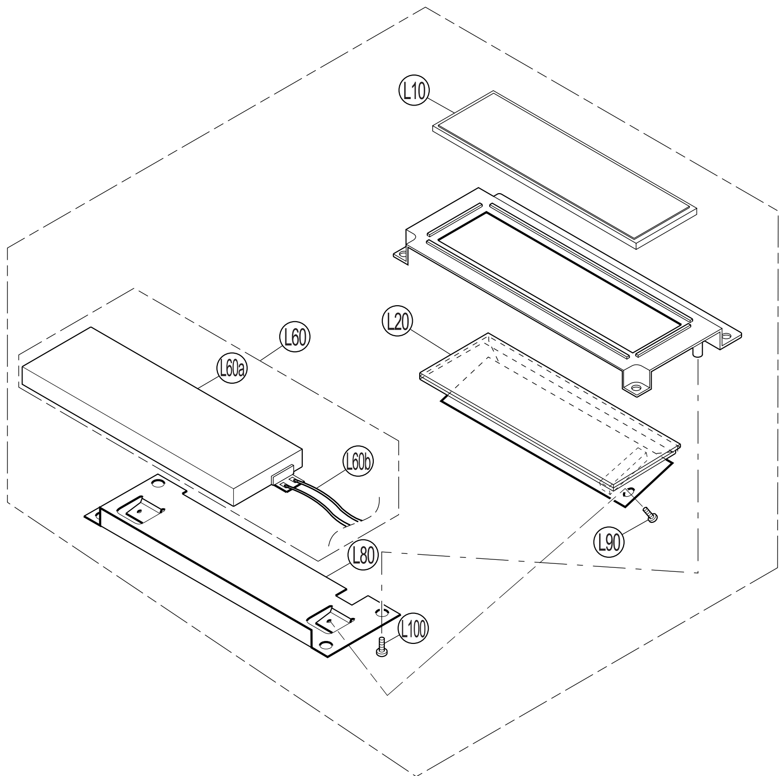


| | REF NO. | PART NO. | DESCRIPTION | | | REMARKS | QTY | RANK |
|---|---|---|---|---|---|---|---|---|
| | | | OVERALL ASSEMBLY | | | RM1X | | |
| | | -- | Overall Assembly | | | J,U,E (V273750) | | |
| * | 10 | V2645400 | Top Cover | | | | | |
| * | 20 | V2875900 | LED Cover | | | | | |
| | 30 | V2737900 | LCD Assembly | | | | | |
| | 40 | EP600190 | Bind Head Tapping Screw-B | 3.0X8 MFZN2BL | | | 4 | 01 |
| | 55 | -- | PN-SW Assembly | | | (V273800) | | |
| | 60 | EP600230 | Bind Head Tapping Screw-B | 3.0X6 MFZN2BL | | | 12 | 01 |
| | 80 | EP600230 | Bind Head Tapping Screw-B | 3.0X6 MFZN2BL | | | 2 | 01 |
| | 100 | EP600230 | Bind Head Tapping Screw-B | 3.0X6 MFZN2BL | | | 4 | 01 |
| | 110 | -- | Connector Assembly | 8P-300 | | (VK10590) | | |
| | 120 | -- | Connector Assembly | 9P-150 | | (VK10140) | | |
| | 130 | -- | Connector Assembly | 10P-250 | | (VJ98270) | | |
| | 140 | -- | Connector Assembly | 11P-350 | | (VK10860) | | |
| | 150 | VK106300 | Connector Assembly | 12P-300 | | | | 06 |
| | 160 | -- | Connector Assembly | 16P-200 | | (VK10340) | | |
| * | 170 | V2605300 | Connector Assembly | FLAT | | | | |
| * | 180 | V2605400 | Connector Assembly | FDD | | | | |
| | 190 | -- | Connector Assembly | MVR | | (V260550) | | |
| | 200 | -- | Shield Plate | | | (V264600) | | |
| | 210 | EP600230 | Bind Head Tapping Screw-B | 3.0X6 MFZN2BL | | | 6 | 01 |
| | 211 | EP600190 | Bind Head Tapping Screw-B | 3.0X8 MFZN2BL | | | 4 | 01 |
| | 212 | VQ049800 | Bonding Head Screw-B | 3.0X10 MFZN2BL | | | 2 | 01 |
| | 220 | -- | FDD Assembly | | | (V273890) | | |
| | 220a | -- | Holder, FDD | | | (V264590) | | |
| | 220b | VZ046700 | Floppy Disk Drive | MF355F-3252MG | | | | 16 |
| | 220c | EP630210 | Bind Head Tapping Screw-S | 3.0X6 MFZN2BL | | | 4 | 01 |
| | 230 | EP600230 | Bind Head Tapping Screw-B | 3.0X6 MFZN2BL | | | 3 | 01 |
| | 231 | EP600190 | Bind Head Tapping Screw-B | 3.0X8 MFZN2BL | | | | 01 |
| * | 240 | V2604800 | Circuit Board | DM | | | | |
| | 250 | EP600230 | Bind Head Tapping Screw-B | 3.0X6 MFZN2BL | | | 6 | |
| | 251 | VQ049800 | Bonding Head Screw-B | 3.0X10 MFZN2BL | | | | 01 |
| | 260 | VS246400 | Lithium Battery | CR2450 | | | | |
| | 270 | -- | Bottom Assembly | | | (V273930) | | |
| * | 270a | V2645600 | Bottom Cover | | | | | |
| | 270b | VU678800 | Foot | 3D45 | | | 4 | 03 |
| | 280 | EP600230 | Bind Head Tapping Screw-B | 3.0X6 MFZN2BL | | | 8 | 01 |
| | 281 | VQ049800 | Bonding Head Screw-B | 3.0X10 MFZN2BL | | | 4 | 01 |
| | 290 | VG016600 | Cord Column | | | | | 01 |
| | 300 | VQ049800 | Bonding Head Screw-B | 3.0X10 MFZN2BL | | | | 01 |
| | 310 | VQ049800 | Bonding Head Screw-B | 3.0X10 MFZN2BL | | | 2 | 01 |
| * | 320 | V2647700 | Knob | | | F1 to F4 | 4 | |
| * | 330 | V2887900 | Knob | | | BEAT STRETCH,CLOCK SHIFT, GATE TIME,VELOCITY, CUTOFF,RESONANCE, EG DECAY,PITCH BEND, VOLUME | 9 | |
| | 340 | VA126100 | Adhesive Tape | 12X50 | | | 2 | 03 |
| | 350 | CB825380 | Push Button | | | STANDBY/ON | | 03 |
| | | | | | | | | |
| | | | ACCESSORIES | | | | | |
| ⚠ | | VU113800 | AC Adapter | PA-5C J | | J | | 09 |
| ⚠ * | | VU113700 | AC Adapter | PA-5C U/C | | U | | |
| ⚠ * | | VU113600 | AC Adapter | PA-5C E | | E | | |
| * | | XV418A00 | Floppy Disk | | | | | |

* New Parts

RANK : Japan only

## LCD ASSEMBLY

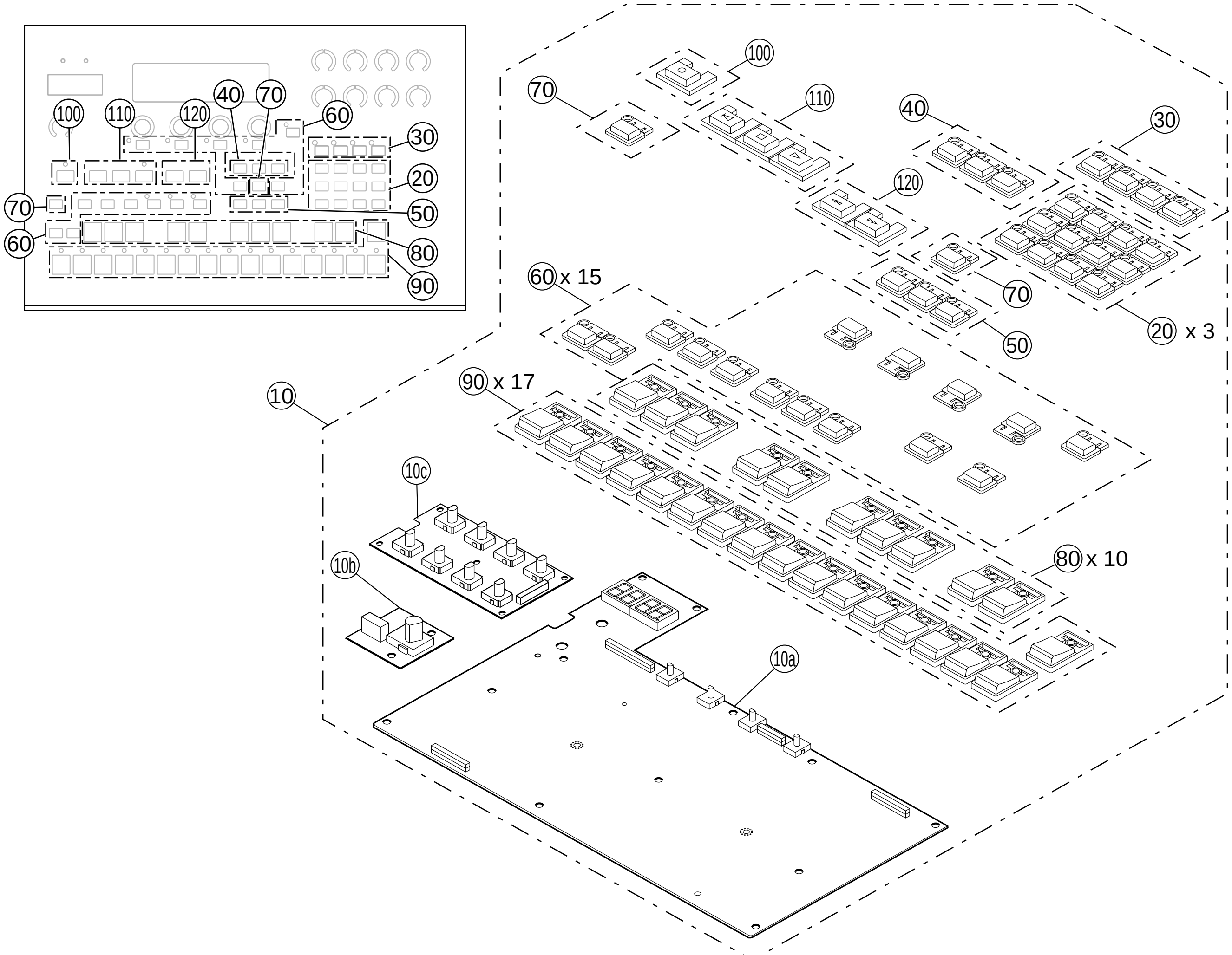



| REF NO. | PART NO. | DESCRIPTION | | | REMARKS | QTY | RANK |
|---|---|---|---|---|---|---|---|
| | | LCD ASSEMBLY | | | RM1x | | |
| | V2737900 | LCD Assembly | | | | | |
| * 10 | V2737600 | LCD Cover | | | | | |
| 20 | VT282300 | LCD | EDMMR03Y00 | | | | 16 |
| 30 | VB390800 | Connector Base Post | PH-12P TE | | | | 01 |
| 60 | VT210200 | Back-lit Assembly | | | | | 14 |
| 60a | VT210100 | LED | YAK-08A-72 | | | | |
| 60b | VT287000 | Connector Assembly | B-LIGHT | | | | |
| 70 | V2645700 | Escutcheon | | | | | |
| 80 | V3203300 | Angle Bracket, LCD | | | | 2 | 06 |
| 90 | EP600230 | Bind Head Tapping Screw-B | 3.0X6 MFZN2BL | | | 2 | 01 |
| 100 | EP600190 | Bind Head Tapping Screw-B | 3.0X8 MFZN2BL | | | | 01 |

* New Parts

RANK : Japan only

## ■ PN-SW ASSEMBLY（PN-SW Assy）




| | REF NO. | PART NO. | DESCRIPTION | | | REMARKS | QTY | RANK |
|---|---|---|---|---|---|---|---|---|
| | | | PN-SW ASSEMBLY | | | RM1x | | |
| | 10 | -- | PN-SW Assembly | | | (V273800) | | |
| * | 10a | NX820310 | Circuit Board | PN | | (V260500) | | 19 |
| * | 10b | NX820320 | Circuit Board | MVR | | (V260510) | | 12 |
| * | 10c | NX820330 | Circuit Board | KNOB | | (V260520) | | 12 |
| * | 20 | V2689300 | Button Black | | | GROOVE/PLAY FX/MIDI DELAY | 3 | 03 |
| | | | | | | /ARPEGGIO,SETUP/EFFECT | | |
| | | | | | | /VOICE EDIT/VOICE, | | |
| | | | | | | DISK/JOB/EDIT/SPLIT | | |
| * | 30 | V2689400 | Button White | | | PATTERN,PATT CHAIN,SONG, | | 04 |
| | | | | | | UTILITY | | |
| * | 40 | V2689100 | Button Black | DISPLAY (<-, ->), EXIT | | DISPLAY(<-,->),EXIT | 3 | 04 |
| * | 50 | V2689200 | Button White | CURSOR (<-, down, ->) | | CURSOR(<-,down,->) | 3 | 04 |
| * | 60 | V2646500 | Button Black | | | TRACK,TRANSPOSE,NUM,MUTE, | 15 | 03 |
| | | | | | | SECTION,ARPEGGIO ON, | | |
| | | | | | | F1 to F4,KNOB,OCT UP, | | |
| | | | | | | OCT DOWN,NO -1,YES +1 | | |
| * | 70 | V2689000 | Button White | | | SHIFT,CURCOR(up) | 2 | 03 |
| * | 80 | V2689500 | Keyboard Black | | | ALL,1-8,9-16,+/--,BPM,MUTE MEMORY | 10 | 03 |
| * | 90 | V2647000 | Keyboard White | | | 1 to 16,TAP | 17 | |
| * | 100 | V2738400 | Switch Knob | L1WREC | | REC | | 03 |
| * | 110 | V2738500 | Switch Knob | L3WPLAY | | ◀, ■, ▶ | | 04 |
| * | 120 | V2738600 | Switch Knob | L2WFWD | | ◀◀ , ▶▶ | | 04 |

* New Parts

RANK : Japan only

# ELECTRICAL PARTS

| REF NO. | PART NO. | DESCRIPTION | | | REMARKS | QTY | RANK |
|---|---|---|---|---|---|---|---|
| | | ELECTRICAL PARTS | | | RM1x | | |
| | NX820310 | Circuit Board | PN | | (XU710B0) | | |
| | V2604800 | Circuit Board | DM | | (XU709B0) | | |
| | NX820320 | Circuit Board | MVR | | (XU710B0) | | |
| | NX820330 | Circuit Board | KNOB | | (XU710B0) | | |
| * | V2604800 | Circuit Board | DM | | (XU709B0) | | |
| 20 | -- | Heat Sink | T220M 25L | | (BA80852) | | |
| 30 | EG330360 | Bind Head Screw | 3.0X6 MFZN2BL | | | | 01 |
| 40 | -- | Jack Angle | | | (V264620) | | |
| * 50 | XV161B00 | IC | M27C160-16-F1 | | MAIN-1 16M EPROM | | |
| * 60 | XV162B00 | IC | M27C160-100F1 | | MAIN-2 16M EPROM | | |
| BAT1 | VS246300 | Battery Holder | CR2450BH | | | | 03 |
| C1 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| -4 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| C5 | UB051220 | Monolithic Ceramic Cap. | SL 22P 50V J | | | | 01 |
| C6 | UB051220 | Monolithic Ceramic Cap. | SL 22P 50V J | | | | 01 |
| C7 | UB012470 | Monolithic Ceramic Cap. | B 470P 50V K | | | | 01 |
| C8 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| C9 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| -27 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| C28 | UB051150 | Monolithic Ceramic Cap. | SL 15P 50V J | | | | 01 |
| -29 | UB051150 | Monolithic Ceramic Cap. | SL 15P 50V J | | | | 01 |
| C30 | UG037100 | Electrolytic Cap. (chip) | 10UF 16V | | | | 01 |
| C31 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| -35 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| C37 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| C38 | UG037100 | Electrolytic Cap. (chip) | 10UF 16V | | | | 01 |
| C39 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| * C40 | UG066470 | Electrolytic Cap. (chip) | 4.7UF 50V | | | | |
| C41 | UG037100 | Electrolytic Cap. (chip) | 10UF 16V | | | | |
| C42 | UB012680 | Monolithic Ceramic Cap. | B 680P 50V K | | | | |
| C43 | UB013220 | Monolithic Ceramic Cap. | B 2200P 50V K | | | | 01 |
| C44 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| C45 | UG037100 | Electrolytic Cap. (chip) | 10UF 16V | | | | 01 |
| C46 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| C47 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| C48 | UG037100 | Electrolytic Cap. (chip) | 10UF 16V | | | | 01 |
| C49 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| -58 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| C59 | UB013220 | Monolithic Ceramic Cap. | B 2200P 50V K | | | | 01 |
| C60 | UB044100 | Monolithic Ceramic Cap. | F 0.01 50V Z | | | | 01 |
| C61 | UB013220 | Monolithic Ceramic Cap. | B 2200P 50V K | | | | 01 |
| C62 | UB044100 | Monolithic Ceramic Cap. | F 0.01 50V Z | | | | 01 |
| C63 | UB013220 | Monolithic Ceramic Cap. | B 2200P 50V K | | | | 01 |
| C64 | UB044100 | Monolithic Ceramic Cap. | F 0.01 50V Z | | | | 01 |
| C65 | UB013220 | Monolithic Ceramic Cap. | B 2200P 50V K | | | | 01 |
| C66 | UB044100 | Monolithic Ceramic Cap. | F 0.01 50V Z | | | | 01 |
| C67 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| -68 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| C69 | UB044100 | Monolithic Ceramic Cap. | F 0.01 50V Z | | | | 01 |
| C70 | UB044100 | Monolithic Ceramic Cap. | F 0.01 50V Z | | | | 01 |
| C71 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| -73 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| C74 | UB051220 | Monolithic Ceramic Cap. | SL 22P 50V J | | | | 01 |
| C75 | UB051220 | Monolithic Ceramic Cap. | SL 22P 50V J | | | | 01 |
| C76 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| -84 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| C86 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| C87 | UG037100 | Electrolytic Cap. (chip) | 10UF 16V | | | | 01 |
| C88 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| C89 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| * C90 | UG038100 | Electrolytic Cap. (chip) | 100UF 16V | | | | |
| C91 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| C92 | UG037470 | Electrolytic Cap. (chip) | 47UF 16V | | | | 01 |
| C93 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| C94 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| C95 | UG037470 | Electrolytic Cap. (chip) | 47UF 16V | | | | 01 |
| C96 | UG037470 | Electrolytic Cap. (chip) | 47UF 16V | | | | 01 |
| C97 | UG037100 | Electrolytic Cap. (chip) | 10UF 16V | | | | 01 |

* New Parts

RANK : Japan only

| | REF NO. | PART NO. | DESCRIPTION | | | REMARKS | QTY | RANK |
|---|---|---|---|---|---|---|---|---|
| | C98 | UB013100 | Monolithic Ceramic Cap. | B 1000P 50V K | | | | 01 |
| | C99 | UB052100 | Monolithic Ceramic Cap. | SL 100P 50V J | | | | 01 |
| | C100 | UB013150 | Monolithic Ceramic Cap. | B 1500P 50V K | | | | 01 |
| | C101 | UB052100 | Monolithic Ceramic Cap. | SL 100P 50V J | | | | 01 |
| | C102 | UB013470 | Monolithic Ceramic Cap. | B 4700P 50V K | | | | 01 |
| | C103 | UG037100 | Electrolytic Cap. (chip) | 10UF 16V | | | | 01 |
| | C104 | UG037100 | Electrolytic Cap. (chip) | 10UF 16V | | | | 01 |
| | C105 | UB013100 | Monolithic Ceramic Cap. | B 1000P 50V K | | | | 01 |
| | C106 | UB052100 | Monolithic Ceramic Cap. | SL 100P 50V J | | | | 01 |
| | C107 | UB013150 | Monolithic Ceramic Cap. | B 1500P 50V K | | | | 01 |
| | C108 | UB052100 | Monolithic Ceramic Cap. | SL 100P 50V J | | | | 01 |
| | C109 | UB013470 | Monolithic Ceramic Cap. | B 4700P 50V K | | | | 01 |
| | C110 | UG037100 | Electrolytic Cap. (chip) | 10UF 16V | | | | 01 |
| | C111 | UG037100 | Electrolytic Cap. (chip) | 10UF 16V | | | | 01 |
| | C112 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| | C113 | UG037100 | Electrolytic Cap. (chip) | 10UF 16V | | | | 01 |
| | C114 | UB052100 | Monolithic Ceramic Cap. | SL 100P 50V J | | | | 01 |
| | C115 | UB052100 | Monolithic Ceramic Cap. | SL 100P 50V J | | | | 01 |
| | C116 | UB013470 | Monolithic Ceramic Cap. | B 4700P 50V K | | | | 01 |
| | C117 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| | C118 | UB052100 | Monolithic Ceramic Cap. | SL 100P 50V J | | | | 01 |
| * | C119 | UG037220 | Electrolytic Cap. (chip) | 22UF 16V | | | | |
| * | C120 | UG038100 | Electrolytic Cap. (chip) | 100UF 16V | | | | |
| | C121 | UG037100 | Electrolytic Cap. (chip) | 10UF 16V | | | | 01 |
| | C122 | UB052100 | Monolithic Ceramic Cap. | SL 100P 50V J | | | | 01 |
| | C123 | UB052100 | Monolithic Ceramic Cap. | SL 100P 50V J | | | | 01 |
| | C124 | UB013470 | Monolithic Ceramic Cap. | B 4700P 50V K | | | | 01 |
| | C125 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| | C126 | UB052100 | Monolithic Ceramic Cap. | SL 100P 50V J | | | | 01 |
| * | C127 | UG037220 | Electrolytic Cap. (chip) | 22UF 16V | | | | |
| * | C128 | UG038100 | Electrolytic Cap. (chip) | 100UF 16V | | | | |
| | C129 | UB013100 | Monolithic Ceramic Cap. | B 1000P 50V K | | | | 01 |
| | C130 | UB013100 | Monolithic Ceramic Cap. | B 1000P 50V K | | | | 01 |
| * | C131 | UG038100 | Electrolytic Cap. (chip) | 100UF 16V | | | | |
| | C132 | UG037100 | Electrolytic Cap. (chip) | 10UF 16V | | | | 01 |
| | C133 | UB044100 | Monolithic Ceramic Cap. | F 0.01 50V Z | | | | 01 |
| | C134 | UB044100 | Monolithic Ceramic Cap. | F 0.01 50V Z | | | | 01 |
| | C135 | UR848470 | Electrolytic Cap. | 470.00 25.0V | | | | 01 |
| | C136 | UR848470 | Electrolytic Cap. | 470.00 25.0V | | | | 01 |
| | C137 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| | C138 | UB044100 | Monolithic Ceramic Cap. | F 0.01 50V Z | | | | 01 |
| * | C139 | VJ651000 | Electrolytic Cap. | 1000 16.0V | | | | |
| | C140 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| | -142 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| * | C143 | UG038100 | Electrolytic Cap. (chip) | 100UF 16V | | | | |
| * | C144 | VJ651000 | Electrolytic Cap. | 1000 16.0V | | | | 01 |
| | C145 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | |
| | C146 | VD989700 | Tantalum Capacitor | 4.7 16V M | | | | 03 |
| | C150 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| | C151 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| * | C152 | UG038100 | Electrolytic Cap. (chip) | 100UF 16V | | | | |
| | C153 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| | -155 | UB245100 | Monolithic Ceramic Cap. | F 0.1 25V Z | | | | 01 |
| | CL1 | VV762900 | Quartz Crystal Unit | 7M SMD-49 | | | | 03 |
| | CL2 | VP864900 | Quartz Crystal Unit | 16M SMD-49 | | | | 04 |
| | CL3 | VV905100 | Ceramic Resonator | CSTCC4.00MG0H6-TC | | | | 01 |
| | CL4 | VZ703600 | Quartz Crystal Unit | 8.4672M SMD-49 | | | | 03 |
| | CN1 | VB390600 | Connector Base Post | PH-10P TE | | | | 01 |
| | CN2 | VB389600 | Connector Base Post | PH-11P SE | | | | 01 |
| | CN3 | VB390400 | Connector Base Post | PH- 8P TE | | | | 01 |
| | CN4 | VB390500 | Connector Base Post | PH- 9P TE | | | | 03 |
| | CN5 | VF283400 | Connector Base Post | PH-16P TE | | | | 01 |
| | CN6 | VB390800 | Connector Base Post | PH-12P TE | | | | 01 |
| | CN7 | VQ391300 | Connector | 34P TE | | | | 03 |
| | CN8 | VB390200 | Connector Base Post | PH- 6P TE | | | | 01 |
| | CN9 | VB389800 | Base Post Connector | PH 2P TE | | | | 01 |
| | CN10 | LB918030 | Base Post Connector | XH 3P TE | | | | 01 |
| | D1 | VT332900 | Diode | 1SS355 TE-17 | | | | 01 |
| | -4 | VT332900 | Diode | 1SS355 TE-17 | | | | 01 |
| | D5 | VU653000 | Diode | SFPB59 | | | | 01 |

* New Parts

RANK : Japan only

| REF NO. | PART NO. | DESCRIPTION | | | REMARKS | QTY | RANK |
|---|---|---|---|---|---|---|---|
| D6 | VT332900 | Diode | 1SS355 TE-17 | | | | 01 |
| D7 | VT332900 | Diode | 1SS355 TE-17 | | | | 01 |
| D8 | VQ282500 | Diode | MA737 | | | | 02 |
| D9 | VS201100 | Diode | D1F60 | | | | 01 |
| D10 | VZ016600 | Diode | D3FP3 | | | | 03 |
| D11 | VS201100 | Diode | D1F60 | | | | 01 |
| D12 | VT332900 | Diode | 1SS355 TE-17 | | | | 01 |
| IC1 | XT437A00 | IC | SH7014 | | CPU | | 09 |
| IC2 | VK863100 | IC Socket | DICF-42CS-E | | | | 03 |
| IC3 | VK863100 | IC Socket | DICF-42CS-E | | | | 03 |
| IC4 | XS681A00 | IC | M5M51008BFP-70LLT | | SRAM 1M | | 11 |
| -7 | XS681A00 | IC | M5M51008BFP-70LLT | | SRAM 1M | | 11 |
| IC8 | XP231A00 | IC | TC74AC139F | | DECODER | | 02 |
| IC9 | XP231A00 | IC | TC74AC139F | | DECODER | | 02 |
| IC10 | XI939A00 | IC | HD63266F | | FDC | | 09 |
| IC11 | XQ595A00 | IC | SED1335F0B | | LCDC | | 08 |
| IC12 | XN279C00 | IC | M5M5256DFP-70LL | | SRAM 256K | | 07 |
| IC13 | XR682A00 | IC | TC7S66F | | ANALOG SWITCH | | 01 |
| IC15 | XD657A00 | IC | SN74HC14NSR | | INVERTER | | 02 |
| IC16 | XI686A00 | IC | M62021FP | | RESET | | 04 |
| IC17 | XR858A00 | IC | M5291FP-600C | | DC/DC CONVERTER | | 03 |
| IC18 | XH225A00 | IC | SN74HC574NSR | | D-FF | | 03 |
| IC19 | XH225A00 | IC | SN74HC574NSR | | D-FF | | 03 |
| IC20 | XD833A00 | IC | SN74HC32NSR | | OR | | 01 |
| IC21 | XD838A00 | IC | SN74HC245NSR | | BUFFER | | 04 |
| IC22 | XC726A00 | IC | SN74HC74NSR | | D-FF | | 01 |
| -25 | XC726A00 | IC | SN74HC74NSR | | D-FF | | 01 |
| IC26 | XD838A00 | IC | SN74HC245NSR | | BUFFER | | 04 |
| IC27 | XD657A00 | IC | SN74HC14NSR | | INVERTER | | 02 |
| IC28 | XD657A00 | IC | SN74HC14NSR | | INVERTER | | 02 |
| IC29 | XR682A00 | IC | TC7S66F | | ANALOG SWITCH | | 01 |
| IC30 | VN686000 | Photo Coupler | PC410T | | | | 04 |
| IC30 | VR903700 | Photo Coupler | HCPL-M600 | | | | 04 |
| * IC31 | XV163100 | IC | LH5332600AN | | SUB-1 32M MASK ROM | | |
| * IC32 | XV164100 | IC | LH5332600AN | | SUB-2 32M MASK ROM | | |
| IC33 | XU947A00 | IC | HG73C205FD | | CPU | | 09 |
| * IC34 | XV729A00 | IC | IDT71016S15Y-TR | | SRAM | | |
| IC35 | XS516A00 | IC | UPC2933T-E1 | | REGULATOR +3.3V | | 03 |
| IC36 | XP867A00 | IC | UPD63200GS-E1 | | DAC | | 07 |
| IC37 | XJ598A00 | IC | NJM78L05UA | | REGULATOR +5V | | 02 |
| IC38 | XF291A00 | IC | UPC4570G2 | | OP AMP | | 03 |
| IC39 | XF291A00 | IC | UPC4570G2 | | OP AMP | | 03 |
| IC40 | XQ138A00 | IC | NJM4556AMT1 | | OP AMP | | 03 |
| IC41 | XT442A00 | IC | SI-8050S | | REGULATOR +5V | | 05 |
| IC42 | XT441A00 | IC | UPC2909T-E1 | | REGULATOR 9V | | 03 |
| JK1 | VJ885500 | DIN Connector | 3P YKF51-5054 | | MIDI | | 04 |
| JK2 | VB312600 | Phone Jack | YKB21-5012 | | FOOT SW,OUTPUT R | | 02 |
| -4 | VB312600 | Phone Jack | YKB21-5012 | | OUTPUT L/MONO | | 02 |
| JK5 | VE382300 | Phone Jack | YKB21-5010 | | PHONES | | 01 |
| JK6 | VJ207400 | DC-IN Connector | 16V DC 3A HEC2305 | | DC IN | | 01 |
| L1 | VG238200 | LC Filter | PLT2003C | | | | 04 |
| L2 | VZ017900 | Coil | HP-022J 180U | | | | 05 |
| L3 | VU577000 | Inductance | ELF1010RR-122K | | | | 03 |
| Q1 | VD303700 | Transistor | 2SC3326 A,B TE85R | | | | |
| Q2 | VD303700 | Transistor | 2SC3326 A,B TE85R | | | | |
| Q3 | VJ927200 | Transistor | 2SA1162 O,Y | | | | 01 |
| Q4 | VJ927200 | Transistor | 2SA1162 O,Y | | | | 01 |
| Q5 | VD303700 | Transistor | 2SC3326 A,B TE85R | | | | 01 |
| R1 | RD255100 | Carbon Resistor (chip) | 100.0 0.1 J | | | | 01 |
| R2 | RD255100 | Carbon Resistor (chip) | 100.0 0.1 J | | | | 01 |
| R3 | RD250000 | Carbon Resistor (chip) | 0.0 0.0 J | | | | 01 |
| R4 | RD255100 | Carbon Resistor (chip) | 100.0 0.1 J | | | | 01 |
| -9 | RD255100 | Carbon Resistor (chip) | 100.0 0.1 J | | | | 01 |
| R10 | RD255680 | Carbon Resistor (chip) | 680.0 0.1 J | | | | 01 |
| R11 | RD257100 | Carbon Resistor (chip) | 10.0K 0.1 J | | | | 01 |
| R12 | RD256330 | Carbon Resistor (chip) | 3.3K 0.1 J | | | | 01 |
| R13 | RD255220 | Carbon Resistor (chip) | 220.0 0.1 J | | | | 01 |
| R14 | RD257100 | Carbon Resistor (chip) | 10.0K 0.1 J | | | | 01 |
| R15 | RD257100 | Carbon Resistor (chip) | 10.0K 0.1 J | | | | 01 |
| R16 | RD255220 | Carbon Resistor (chip) | 220.0 0.1 J | | | | 01 |

* New Parts

RANK : Japan only

| REF NO. | PART NO. | DESCRIPTION | | | REMARKS | QTY | RANK |
|---|---|---|---|---|---|---|---|
| -25 | RD255220 | Carbon Resistor (chip) | 220.0 0.1 J | | | | 01 |
| R26 | RD256100 | Carbon Resistor (chip) | 1.0K 0.1 J | | | | 01 |
| -33 | RD256100 | Carbon Resistor (chip) | 1.0K 0.1 J | | | | 01 |
| R34 | RD257100 | Carbon Resistor (chip) | 10.0K 0.1 J | | | | 01 |
| -37 | RD257100 | Carbon Resistor (chip) | 10.0K 0.1 J | | | | 01 |
| R38 | RD255100 | Carbon Resistor (chip) | 100.0 0.1 J | | | | 01 |
| -41 | RD255100 | Carbon Resistor (chip) | 100.0 0.1 J | | | | 01 |
| R42 | RD257100 | Carbon Resistor (chip) | 10.0K 0.1 J | | | | 01 |
| -45 | RD257100 | Carbon Resistor (chip) | 10.0K 0.1 J | | | | 01 |
| R46 | RD256100 | Carbon Resistor (chip) | 1.0K 0.1 J | | | | 01 |
| -50 | RD256100 | Carbon Resistor (chip) | 1.0K 0.1 J | | | | 01 |
| R51 | RD257100 | Carbon Resistor (chip) | 10.0K 0.1 J | | | | 01 |
| R52 | RD255100 | Carbon Resistor (chip) | 100.0 0.1 J | | | | 01 |
| -59 | RD255100 | Carbon Resistor (chip) | 100.0 0.1 J | | | | 01 |
| R60 | RD256220 | Carbon Resistor (chip) | 2.2K 0.1 J | | | | 01 |
| R61 | RD257100 | Carbon Resistor (chip) | 10.0K 0.1 J | | | | 01 |
| -67 | RD257100 | Carbon Resistor (chip) | 10.0K 0.1 J | | | | 01 |
| R68 | RD256100 | Carbon Resistor (chip) | 1.0K 0.1 J | | | | 01 |
| R69 | RD257100 | Carbon Resistor (chip) | 10.0K 0.1 J | | | | 01 |
| R70 | RD153390 | Carbon Resistor (chip) | 3.9 1/4 J | | | | 01 |
| R71 | RD154470 | Carbon Resistor (chip) | 47.0 1/4 J | | | | 01 |
| -78 | RD154470 | Carbon Resistor (chip) | 47.0 1/4 J | | | | 01 |
| R79 | RD256100 | Carbon Resistor (chip) | 1.0K 0.1 J | | | | 01 |
| -86 | RD256100 | Carbon Resistor (chip) | 1.0K 0.1 J | | | | 01 |
| R87 | RD258100 | Carbon Resistor (chip) | 100.0K 0.1 J | | | | 01 |
| R88 | RD258220 | Carbon Resistor (chip) | 220.0K 0.1 J | | | | 01 |
| R89 | RD258100 | Carbon Resistor (chip) | 100.0K 0.1 J | | | | 01 |
| R90 | RD258220 | Carbon Resistor (chip) | 220.0K 0.1 J | | | | 01 |
| R91 | RD258100 | Carbon Resistor (chip) | 100.0K 0.1 J | | | | 01 |
| R92 | RD258220 | Carbon Resistor (chip) | 220.0K 0.1 J | | | | 01 |
| R93 | RD258100 | Carbon Resistor (chip) | 100.0K 0.1 J | | | | 01 |
| R94 | RD258220 | Carbon Resistor (chip) | 220.0K 0.1 J | | | | 01 |
| R95 | RD258100 | Carbon Resistor (chip) | 100.0K 0.1 J | | | | 01 |
| R96 | RD257470 | Carbon Resistor (chip) | 47.0K 0.1 J | | | | 01 |
| R97 | RD258100 | Carbon Resistor (chip) | 100.0K 0.1 J | | | | 01 |
| R98 | RD257470 | Carbon Resistor (chip) | 47.0K 0.1 J | | | | 01 |
| R99 | RD258100 | Carbon Resistor (chip) | 100.0K 0.1 J | | | | 01 |
| R100 | RD257470 | Carbon Resistor (chip) | 47.0K 0.1 J | | | | 01 |
| R101 | RD258100 | Carbon Resistor (chip) | 100.0K 0.1 J | | | | 01 |
| R102 | RD257470 | Carbon Resistor (chip) | 47.0K 0.1 J | | | | 01 |
| R103 | RD257100 | Carbon Resistor (chip) | 10.0K 0.1 J | | | | 01 |
| R104 | RD255220 | Carbon Resistor (chip) | 220.0 0.1 J | | | | 01 |
| -106 | RD255220 | Carbon Resistor (chip) | 220.0 0.1 J | | | | 01 |
| R107 | RD256100 | Carbon Resistor (chip) | 1.0K 0.1 J | | | | 01 |
| R108 | RD257100 | Carbon Resistor (chip) | 10.0K 0.1 J | | | | 01 |
| R109 | RD258100 | Carbon Resistor (chip) | 100.0K 0.1 J | | | | 01 |
| R110 | RD257100 | Carbon Resistor (chip) | 10.0K 0.1 J | | | | 01 |
| R111 | RD256100 | Carbon Resistor (chip) | 1.0K 0.1 J | | | | 01 |
| R113 | RD257100 | Carbon Resistor (chip) | 10.0K 0.1 J | | | | 01 |
| R114 | RD255330 | Carbon Resistor (chip) | 330.0 0.1 J | | | | 01 |
| R115 | RD257100 | Carbon Resistor (chip) | 10.0K 0.1 J | | | | 01 |
| R116 | RD257100 | Carbon Resistor (chip) | 10.0K 0.1 J | | | | 01 |
| R117 | RD257100 | Carbon Resistor (chip) | 10.0K 0.1 J | | | | 01 |
| R118 | RD257220 | Carbon Resistor (chip) | 22.0K 0.1 J | | | | 01 |
| R119 | RD256680 | Carbon Resistor (chip) | 6.8K 0.1 J | | | | 01 |
| R120 | RD256680 | Carbon Resistor (chip) | 6.8K 0.1 J | | | | 01 |
| R121 | RD257100 | Carbon Resistor (chip) | 10.0K 0.1 J | | | | 01 |
| R122 | RD256470 | Carbon Resistor (chip) | 4.7K 0.1 J | | | | 01 |
| R123 | RD256100 | Carbon Resistor (chip) | 1.0K 0.1 J | | | | 01 |
| R124 | RD257220 | Carbon Resistor (chip) | 22.0K 0.1 J | | | | 01 |
| R125 | RD256680 | Carbon Resistor (chip) | 6.8K 0.1 J | | | | 01 |
| R126 | RD256680 | Carbon Resistor (chip) | 6.8K 0.1 J | | | | 01 |
| R127 | RD257100 | Carbon Resistor (chip) | 10.0K 0.1 J | | | | 01 |
| R128 | RD256470 | Carbon Resistor (chip) | 4.7K 0.1 J | | | | 01 |
| R129 | RD256100 | Carbon Resistor (chip) | 1.0K 0.1 J | | | | 01 |
| R130 | RD256680 | Carbon Resistor (chip) | 6.8K 0.1 J | | | | 01 |
| R131 | RD257470 | Carbon Resistor (chip) | 47.0K 0.1 J | | | | 01 |
| R134 | RD257100 | Carbon Resistor (chip) | 10.0K 0.1 J | | | | 01 |
| R135 | VI195700 | Chip Metal Film Resistor | 2.2K 0.1 J | | | | 01 |
| R136 | VI195700 | Chip Metal Film Resistor | 2.2K 0.1 J | | | | 01 |

* New Parts

RANK : Japan only

| REF NO. | PART NO. | DESCRIPTION | | | REMARKS | QTY | RANK |
|---|---|---|---|---|---|---|---|
| R137 | RD154470 | Carbon Resistor (chip) | 47.0 1/4 J | | | | 01 |
| R138 | RD257470 | Carbon Resistor (chip) | 47.0K 0.1 J | | | | 01 |
| R139 | RD257120 | Carbon Resistor (chip) | 12.0K 0.1 J | | | | 01 |
| R140 | RD256470 | Carbon Resistor (chip) | 4.7K 0.1 J | | | | 01 |
| R141 | RD256820 | Carbon Resistor (chip) | 8.2K 0.1 J | | | | 01 |
| R142 | RD257180 | Carbon Resistor (chip) | 18.0K 0.1 J | | | | 01 |
| R143 | RD257100 | Carbon Resistor (chip) | 10.0K 0.1 J | | | | 01 |
| R144 | RD256100 | Carbon Resistor (chip) | 1.0K 0.1 J | | | | 01 |
| R145 | RD257470 | Carbon Resistor (chip) | 47.0K 0.1 J | | | | 01 |
| R146 | RD257120 | Carbon Resistor (chip) | 12.0K 0.1 J | | | | 01 |
| R147 | RD256470 | Carbon Resistor (chip) | 4.7K 0.1 J | | | | 01 |
| R148 | RD256820 | Carbon Resistor (chip) | 8.2K 0.1 J | | | | 01 |
| R149 | RD257180 | Carbon Resistor (chip) | 18.0K 0.1 J | | | | 01 |
| R150 | RD257100 | Carbon Resistor (chip) | 10.0K 0.1 J | | | | 01 |
| R151 | RD256100 | Carbon Resistor (chip) | 1.0K 0.1 J | | | | 01 |
| R152 | RD250000 | Carbon Resistor (chip) | 0.0 0.0 J | | | | 01 |
| R153 | RD258100 | Carbon Resistor (chip) | 100.0K 0.1 J | | | | 01 |
| R154 | RD255100 | Carbon Resistor (chip) | 100.0 0.1 J | | | | 01 |
| R155 | RD257470 | Carbon Resistor (chip) | 47.0K 0.1 J | | | | 01 |
| R156 | RD255220 | Carbon Resistor (chip) | 220.0 0.1 J | | | | 01 |
| R157 | RD256100 | Carbon Resistor (chip) | 1.0K 0.1 J | | | | 01 |
| R158 | RD256100 | Carbon Resistor (chip) | 1.0K 0.1 J | | | | 01 |
| R159 | RD257100 | Carbon Resistor (chip) | 10.0K 0.1 J | | | | 01 |
| R160 | RD257100 | Carbon Resistor (chip) | 10.0K 0.1 J | | | | 01 |
| R161 | RD257470 | Carbon Resistor (chip) | 47.0K 0.1 J | | | | 01 |
| R162 | RD257470 | Carbon Resistor (chip) | 47.0K 0.1 J | | | | 01 |
| R163 | RD155470 | Carbon Resistor (chip) | 470.0 1/4 J | | | | |
| R164 | RD255100 | Carbon Resistor (chip) | 100.0 0.1 J | | | | 01 |
| R165 | VC741300 | Metal Oxide Film Resistor | 3.3 1W J | | | | 01 |
| R166 | RD257100 | Carbon Resistor (chip) | 10.0K 0.1 J | | | | 01 |
| R167 | RD255220 | Carbon Resistor (chip) | 220.0 0.1 J | | | | 01 |
| R168 | RD255100 | Carbon Resistor (chip) | 100.0 0.1 J | | | | 01 |
| -173 | RD255100 | Carbon Resistor (chip) | 100.0 0.1 J | | | | 01 |
| R174 | RD257470 | Carbon Resistor (chip) | 47.0K 0.1 J | | | | 01 |
| R175 | RD256470 | Carbon Resistor (chip) | 4.7K 0.1 J | | | | 01 |
| RA1 | RE045100 | Resistor Array | 100X4 | | | | 01 |
| -10 | RE045100 | Resistor Array | 100X4 | | | | 01 |
| RA11 | RE047100 | Resistor Array | 10KX4 | | | | 01 |
| -19 | RE047100 | Resistor Array | 10KX4 | | | | 01 |
| SW1 | VP691000 | Push Switch | SDDLB1 | | STANDBY/ON | | 03 |
| TA1 | XN153A00 | IC | TD62083F-TP1 | | DRIVER ARRAY | | 04 |
| TA2 | VT943400 | Transistor Array | TD62785F(TP1) | | | | 04 |
| VR1 | VM755200 | Rotary Variable Resistor | B 1.0K RK09K111 | | CONTRAST | | 01 |
| ZD1 | VU171500 | Zener Diode | UDZ 3.6BTE-17 3.6V | | | | 01 |
| | | | | | | | |
| * | NX820310 | Circuit Board | PN | | (XU710B0) | | |
| * | NX820320 | Circuit Board | MVR | | (XU710B0) | | |
| * | NX820330 | Circuit Board | KNOB | | (XU710B0) | | |
| CN1 | VB390600 | Connector Base Post | PH-10P TE | | | | 01 |
| * CN2 | VB389600 | Connector Base Post | PH-11P TE | | | | |
| CN3 | VB390400 | Connector Base Post | PH- 8P TE | | | | 01 |
| CN4 | VB390500 | Connector Base Post | PH-9P TE | | | | 01 |
| CN5 | VF283400 | Connector Base Post | PH-16P TE | | | | 01 |
| CN6 | VB858500 | Connector Base Post | PH- 6P SE | | | | 01 |
| D1 | VT332900 | Diode | 1SS355 TE-17 | | | | 01 |
| -72 | VT332900 | Diode | 1SS355 TE-17 | | | | 01 |
| LED1 | VT022800 | LED | SEL2210R TP8 RE | | 1 to 9,A,B,C, | | 01 |
| -20 | VT022800 | LED | SEL2210R TP8 RE | | D,E,F,0,REC | | 01 |
| LED21 | VT022900 | LED | SEL2410G TP8 GR | | PLAY | | 01 |
| LED22 | VT022800 | LED | SEL2210R TP8 RE | | F1 to F4,KNOB | | 01 |
| -26 | VT022800 | LED | SEL2210R TP8 RE | | | | 01 |
| LED27 | VT022900 | LED | SEL2410G TP8 GR | | PATTERN,PATT CHAIN,SONG | | 01 |
| -30 | VT022900 | LED | SEL2410G TP8 GR | | UTILITY | | 01 |
| LED31 | V3280000 | LED Display | HDSP-5521 (G,H) | | | | 05 |
| LED32 | V3280000 | LED Display | HDSP-5521 (G,H) | | | | 05 |
| LED33 | VT022800 | LED | SEL2210R TP8 RE | | MIDI IN | | 01 |
| LED34 | VT022900 | LED | SEL2410G TP8 GR | | MIDI OUT | | 01 |
| R1 | RD255220 | Carbon Resistor (chip) | 220.0 0.1 J | | | | 01 |
| -8 | RD255220 | Carbon Resistor (chip) | 220.0 0.1 J | | | | 01 |
| RE1 | VR101400 | Encoder | EC16B24204 L=15 | | F1 to F4 | | 04 |

* New Parts

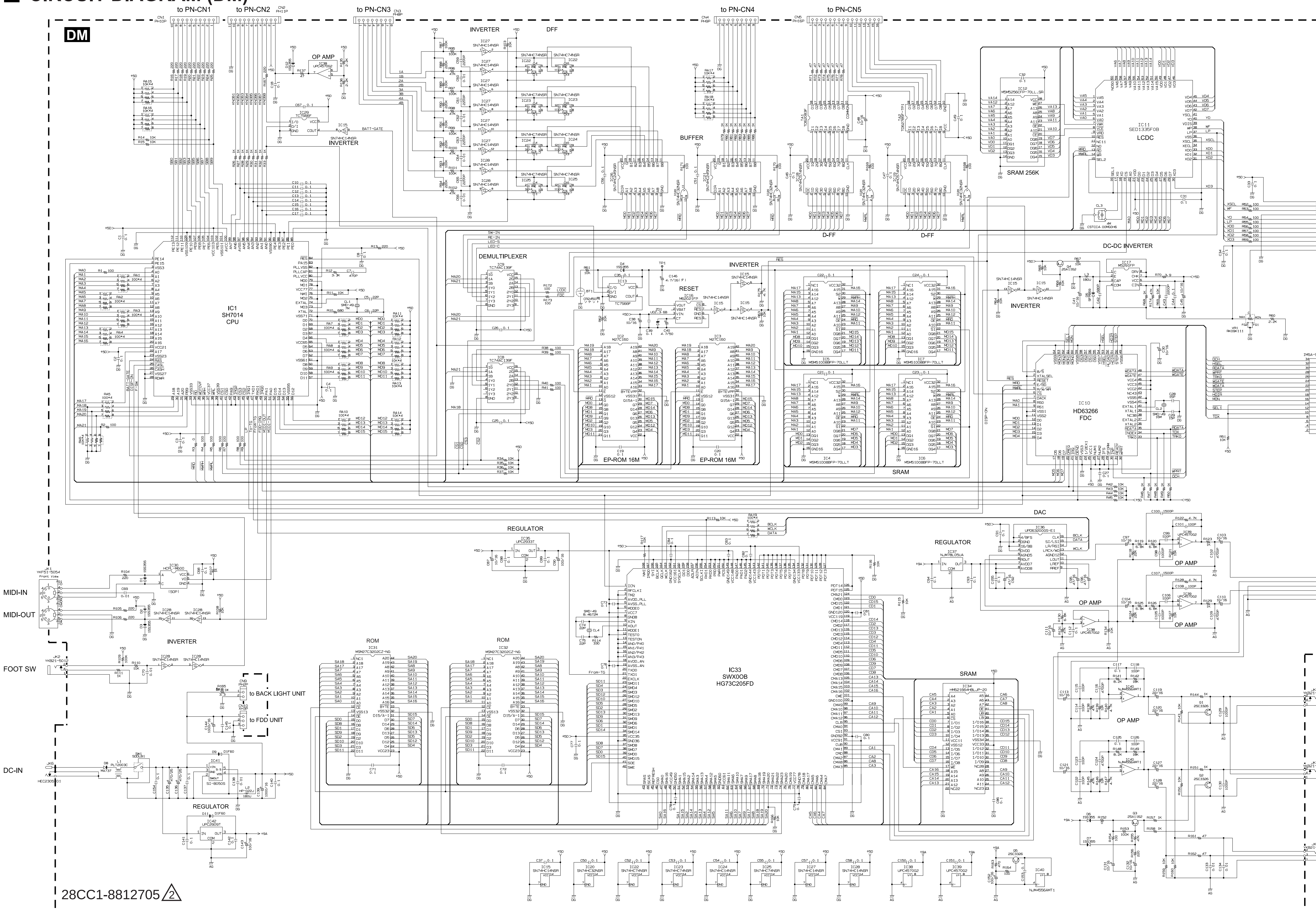
**RANK : Japan only**

| | REF NO. | PART NO. | DESCRIPTION | | | REMARKS | QTY | RANK |
|---|---|---|---|---|---|---|---|---|
| | -4 | VR101400 | Encoder | EC16B24204 L=15 | | | | 04 |
| | S1 | VZ085500 | Tact Switch | SKQNAM004A | | | | 01 |
| | S2 | VZ085500 | Tact Switch | SKQNAM004A | | | | 01 |
| | S3 | VS180900 | Push Switch | SKEYAG | | | | 01 |
| | -29 | VS180900 | Push Switch | SKEYAG | | | | |
| | S30 | VZ085500 | Tact Switch | SKQNAM004A | | | | 01 |
| | -72 | VZ085500 | Tact Switch | SKQNAM004A | | OCT DOWN | | |
| | | | | | | OCT UP | | |
| | | | | | | 1 to 16,ALL,1-8, 9-16,--,BPM | | |
| | | | | | | MUTE MEMORY,TAP | | |
| | | | | | | SHIFT,TRACK,TRANSPOSE, | | |
| | | | | | | NUM,MUTE,SECTION,FORWARD, | | |
| | | | | | | ARPEGGIO ON,PUASE, STOP, | | |
| | | | | | | REC,PLAY,REWIND,NO,YES, | | |
| | | | | | | CURSOR(<-,->,up,down), | | |
| | | | | | | DISPLAY(<-,->),EXIT,DISK, | | |
| | | | | | | JOB,EDIT,SPLIT,VOICE, | | |
| | VR1 | VQ032500 | Rotary Variable Resistor | B 10.0K RK11K113 | | VOICE EDIT,EFFECT,SETUP, | | 02 |
| | -8 | VQ032500 | Rotary Variable Resistor | B 10.0K RK11K113 | | GROOVE,PLAY FX, | | |
| | | | | | | MIDI DELAY,ARPEGGIO, | | |
| | | | | | | PATTERN,PATT CHAIN,SONG, | | |
| | VR9 | VT683100 | Rotary Variable Resistor | A 10.0K RK14K12C | | UTILITY,F1 to F4,KNOB | | 03 |
| ⚠ | | VU113800 | AC Adapter | PA-5C J | | GATE TIME,VELOCITY, | | 09 |
| ⚠ * | | VU113700 | AC Adapter | PA-5C U/C | | CUTOFF,RESONANCE, | | |
| ⚠ * | | VU113600 | AC Adapter | PA-5C E | | EG DECAY,PITCH BEND | | |
| * | | V2737900 | LCD Assembly | | | | | |
| | | VT282300 | LCD | EDMMR03Y00 | | J | | 16 |
| | | VT210200 | Back-lit Assembly | | | U | | 14 |
| | | VT210100 | LED | YAK-08A-72 | | E | | |
| | | VS246400 | Lithium Battery | CR2450 | | | | |
| | | VZ046700 | Floppy Disk Drive | MF355F-3252MG | | | | 16 |

* New Parts

RANK : Japan only

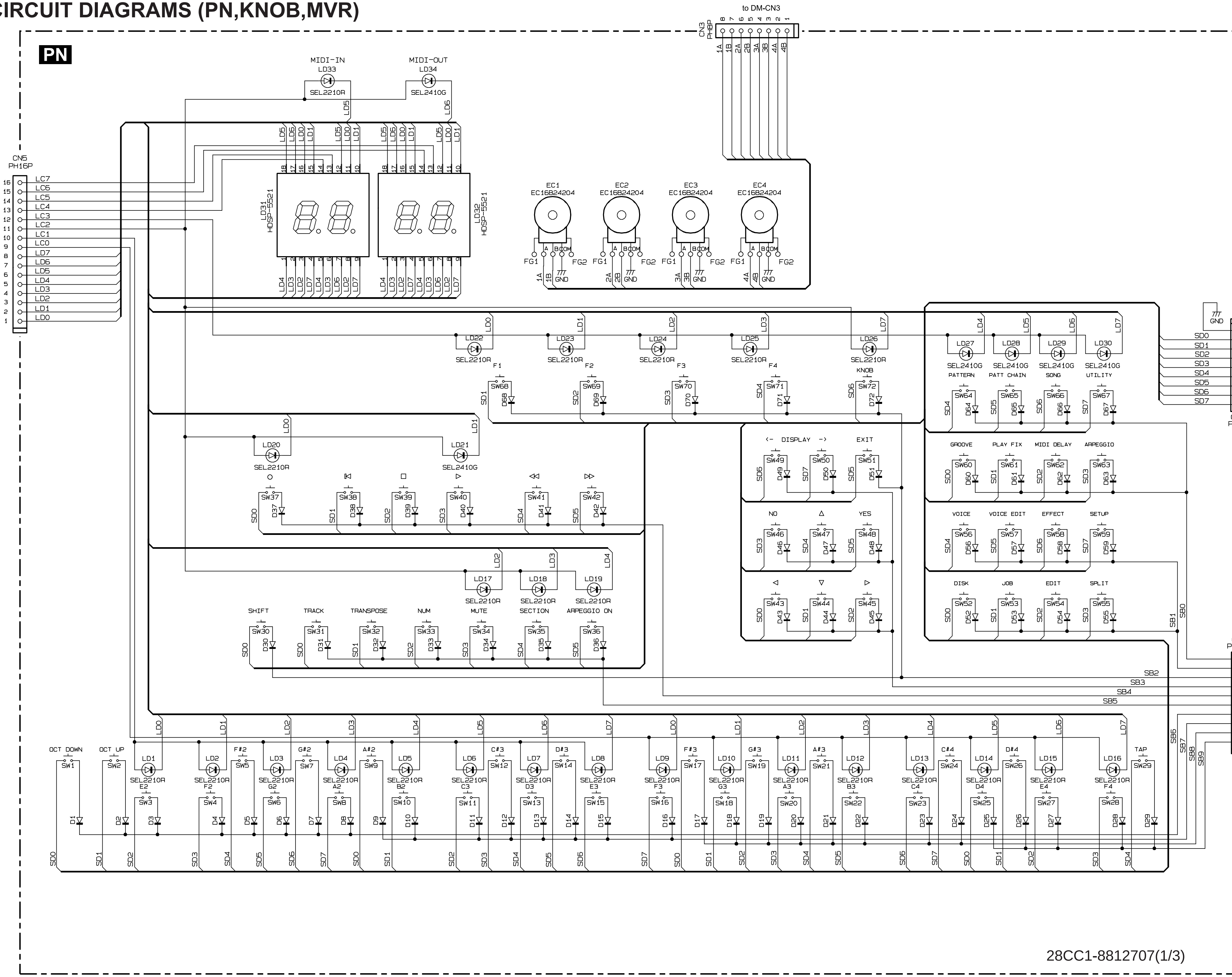
## ■ CIRCUIT DIAGRAM (DM)

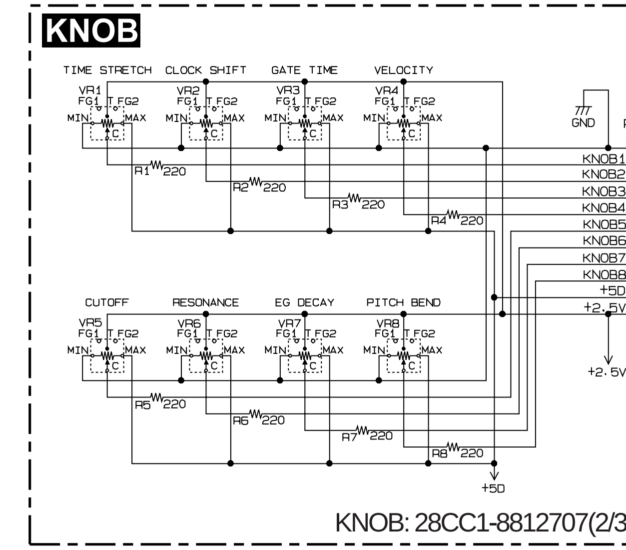


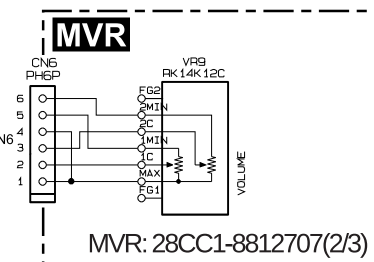

**Note: See parts list for details of circuit board component parts.**

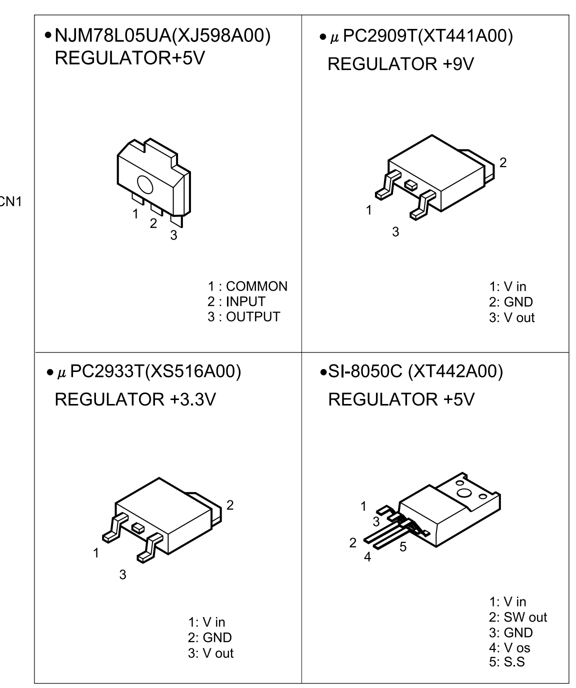
**注：シートの部品詳細はパーツリストをご参照下さい。**

# ■ CIRCUIT DIAGRAMS (PN,KNOB,MVR)




**Note: See parts list for details of circuit board component parts.**